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ORIGINAL ARTICLES.

BACTERIAL TOXINS AND ANTI-TOXINS.*

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Mr. President, Ladies and Gentlemen:

A well-known author has aptly pointed out that the first stride toward the supremacy of the human race as living beings was accomplished when primeval man learned the art of defence against the wild beasts of the forests. The discovery of weapons for defence and offense assured for all time the higher position of man in the development of this world. We can but approximately indicate the period when this discovery of far-reaching importance was made. The principle of mastery, once asserted, has been continued down through the ages to our own time. Man has indeed established his right to be the lord of all he surveys. During these countless years, however, man has waged an unequal contest against a foe vastly more dangerous than the ferocious wild animals of the land, water or air. Storms on sea and land, volcanic eruptions, fire and other physical agencies may claim hundreds and thousands of lives, but this number is insignificant compared with that army of men forced to yield before the dread arms of disease. The strong and the weak, the rich and the poor, have been alike compelled to bow down before an invisible and apparently invincible foe.

When we consider that more than one-third of the human race lay down their lives as the result of that accident, known as a communicable disease, we can appreciate how relentless an enemy man has to deal with. No one discovery redounds more to the credit of the last quarter of the nineteenth century than the recognition that this class of disease is due to lower forms of life. The unknown cause of disease has become known, the invisible foe has been rendered visible, and the hitherto invincible enemy has been met and forced to yield on his own ground. Scarcely a score of years has passed by since the first germ was demonstrated to be the cause of a disease, and yet what triumphs have been accomplished in that short space of time. Preventive medicine has been furnished a rational basis in its struggle against the spread of disease. There was a time when cholera, starting from its home in India, could in the short space of a year or two encompass the

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world. That time is now past. Cholera may come to our ports from distant lands, but it can go no further, thanks to our knowledge of the cause of the disease, the way in which it is contracted and the means by which it is arrested. The brilliant results achieved in obstetrics and in surgery have been rendered possible by the labors of a Semmelweiss and a Lister. In curative medicine a new era was marked by Pasteur's work on hydrophobia, and the more recent work on antitoxins.

Only a few weeks ago the French Academy of Sciences, the highest tribunal of its kind, divided a standing prize for the cure of diphtheria between Behring and Roux. More than prize money, the gratitude of the world belongs to these devoted, disinterested and persevering investigators in experimental medicine. This is humanitarian work in its highest and noblest sense and should forever silence the harpings of those zoophiles that look upon the use of animals for experimentation as a blot upon our civilization. The discovery of antitoxin as a cure for diphtheria was not an accident, but the logical sequence of patient, prolonged, systematic investigation extending over many years. Its value was demonstrated in the laboratory long before it was applied to man. It is within a laboratory that the cause of a disease is ascertained and it is from the laboratory that our curative and preventive methods must come. In no other way is this possible, as the records of the centuries that have rolled by abundantly testify.

Of the lower forms of life that produce disease, the bacterium claims our attention most. It is the smallest of living beings—the microscopic, single-celled plant—that is most deadly to man, and for that matter to other animals and plants. The great French physiologist, Claude Bernard, stated axiomatically and well "la mort, c'est la vie." Because bacteria are so commonly mentioned as the cause of disease, it should not be inferred that all bacteria possess this power. On the contrary, the number of disease-producing forms is exceedingly small compared with the large number of more or less harmless forms. The rôle of bacteria in nature is an exceedingly important one, and the close student will see that the phenomenon of disease, instead of being entirely independent, falls under this general action. Bacteria as living cells require certain food. Higher plants secure their food material from such inorganic, simple compounds as carbonic acid, ammonia, nitrous and nitric acid. On the other hand, bacteria, likewise plants, though of the lowest forms, cannot utilize these simple substances. They must have organic substances; compounds elaborated by the living cell, whether animal or vegetable. The majority of bacteria live on dead organic matter. When a plant or an animal dies, it serves to support the lives of myriads of bacteria. As a result of their action on this complex, dead matter, the carbohydrate molecule, as starch, sugar or cellulose, is changed to gases as carbonic acid, marsh gas, etc.; to fatty acids, such as acetic, lactic, butyric acids, and to a variety of other compounds, among which might be mentioned the alcohols. The proteid matter, which constitutes so large a part of animal and vegetable tissues, is likewise acted upon by these minute workers. As a result, an exceedingly large variety of products arise depending upon the kind of germ at work and conditions under which it works, such as temperature, oxygen, etc. Bacteria, therefore, primarily live on dead organic matter, the remnants of previous life. As a result of their action the atoms of carbon, hydrogen and nitrogen that have been tied together under the influence of the living cell into the most complex substances known to the chemist, become converted into the simplest inorganic forms. Thus the carbon is returned to the inorganic world as carbonic acid, the hydrogen as water, the nitrogen as ammonia or nitrous or nitric acid. These, it will be observed, are the substances which support higher plant life, which in turn support animal life. Both when dead support bacterial life. It will be seen therefore that bacteria are but the scavengers of nature dissolving and removing dead matter from the surface of the earth. Without their assistance dead matter would remain as such to form one vast charnel house. The nitrogen atom in the dead proteid molecule

would be as useless to new plant life as the nitrogen of the air, while the carbon would be of no more use than the carbonic acid existing in combination in the limestone deposits of the earth's crust. As Pasteur pointed out almost a third of a century ago, "Putrefaction is a phenomenon correlative of life and not of death."

Although most bacteria live as stated, primarily, on dead matter, converting it into simpler forms, there are some that can live on living matter, and consequently breaks this up in simple compounds. The disease-producing bacteria belong to this class. Their action here, as in the case of the germ that lives exclusively on dead matter, is to convert the highly complex substance into simpler forms.

Let us turn our attention now to those products of bacteria that are of special interest from the medical standpoint. In the first place it is desirable to divide our bacteria into two large groups, according to their power to produce poisons. It is customary, therefore to speak of toxicogenic or poison-producing bacteria and of non-toxicogenic bacteria. All disease bacteria produce their effects by means of certain poisonous chemical products. Further than that, there are many bacteria that do not produce disease, that is to say, have not the power of growing within the living body, but which nevertheless may form poisons by their action on dead matter. How widely prevalent germs of this class are, is seen in frequent occurrences of poisoning from foods, such as milk, cheese, ice-cream, meats, etc. The possibility of poisonous metals being introduced into a food must be conceded, but the cause is much more often found to be poisonous bacterial products.

Recognizing then, that all disease bacteria, and sometimes non-pathogenic bacteria produce, in addition to various harmless, fermentative products, certain chemical poisons, we are in a position to inquire as to the nature of these poisons. An Italian toxicologist, Selmi, 20 years ago, while examining extracts from dead bodies, met with substances which, in their chemical behavior to reagents, resembled the vegetable alkaloids, such as strychnine, atropine, morphine, etc. To this class of substances formed in the body after death he gave the name ptomain or cadaveric alkaloid. Inasmuch as at that time the rôle of bacteria in putrefaction was but little understood the genesis of these products was necessarily uncertain. Though Selmi devoted the last years of his life to the study of these basic compounds, yet, owing to imperfect methods, at no time did he succeed in isolating a chemically pure product. It was Brieger, of Berlin, who succeeded, by means of new methods devised by himself, in isolating in a condition of chemical puritv a large number of these basic products or ptomains from decomposing animal matter. In the course of about five years he described no less than twenty-seven distinct ptomains. Other observers have increased the number till to-day we can list more than sixty representatives of this group.

At first Brieger studied the ptomains formed in decomposing flesh, where a variety of different bacteria are at work. Subsequently he extended his researches to pure cultures of pathogenic bacteria, and in a short time was able to demonstrate the presence of poisonous ptomains in cultures of the typhoid bacillus, the germ of tetanus, and the comma bacillus of Asiatic cholera. Here for the first time was a definite answer as to how disease bacteria produce their results. Inasmuch as certain higher plants are known to be poisonous because of the presence of poisonous alkaloids it was assumed that the toxic properties of bacteria were due to bacterial alkaloids or ptomains. So firmly did this view take hold that even until the present time the impression prevails that the dreaded weapons by which bacteria produce disease are ptomains. This, however, is not true; indeed it is far removed from the truth. In the first place there are disease bacteria, such as those of diphtheria and glanders, which in spite of most careful search have failed to yield ptomains. Here there are germs of the most virulent type, the poisons of which certainly do not belong to this class. Again the ptomain isolated from a culture of a pathogenic germ may be incomparably less poisonous than the original fluid from which it was prepared. As an illustration let us take

a culture of the tetanus bacillus. From it we can isolate no less than four distinct ptomains. A dose of one-half gram of tetanin, the most energetic of these four ptomains, is almost without effect in a guinea-pig. It is therefore a comparatively weak poison. On the other hand, the culture liquid from which it was obtained, deprived of all germs by filtration, is so poisonous that that 1-500 of a gram of the liquid is fatal to a guinea-pig. This fatal dose includes, besides the poisonous substance, water as well as inert matter. If we take the total solids in this liquid as amounting to 2½ per cent., and that is nearly twice as much as usual, we will have 1-20,000 of a gram of solids. In other words the liquid from which the ptomain tetanin is obtained contains solids in solution which are ten thousand times more poisonous than the ptomain itself.

Again ptomains have been isolated from cultures of disease bacteria and found to be perfectly harmless. This indeed is true of the majority of ptomains that are known. As a rule they are either not poisonous, or but slightly so. Some, it is true, are active poisons, but their power in this respect is weak compared with other products produced by that same germ. Ptomains are therefore no longer to be considered as the active poison secreted by the bacterial cell. They are but of secondary importance as factors in the causation of disease. To the chemist, and above all to the toxicologist, these products will always be of the greatest interest.

Weir Mitchell and Reichert of Philadelphia, in 1886, in the course of their study as to the nature of the venom of serpents, made a most important discovery. They found the poison of various venoms to belong to the proteid group. One of these poisons belonged to the group of peptons, another to the group of globulins. This observation, so remarkable, and at variance with the then accepted views regarding proteid substances, attracted but little attention. Two years later, however, Roux and Yersin published their classical studies on diphtheria. In this work they were able to show that the diphtheria poison was entirely different from any other known poison. In its behavior to heat, acids and other reagents it resembled ferments, such as pepsin or diastase. They therefore inclined to the belief that the diphtheria poison was a ferment—an enzyme.

This observation led Brieger and Fraenkel to re-investigate the poisons of a number of disease bacteria. By the addition of alcohol or of ammonium sulphate to the filtered bacterial cultures, precipitates were obtained, which after repeated purification gave proteid reactions, and what was more important, in exceedingly minute doses were poisonous to animals. Here then, apparently, was the long-sought-for bacterial poison. Ptomains were but feeble poisons compared with the action of these products. Inasmuch as these substances are proteid in nature, it is customary to speak of them as bacterial proteids. Representatives of the different groups of proteids have been isolated from cultures of various bacteria. Thus from diphtheria an albumin was obtained—the so-called toxalbumin. From cultures of the anthrax bacillus poisonous albumoses were isolated. Pure cultures of the cholera germ yielded a highly poisonous pepton and globulin.

A striking analogy was thus established between the deadly venom of serpents and equally to be feared weapon of bacteria. Another parallel was established by the discovery about the same time, that even higher plants could give rise to highly poisonous proteids. From the jequirity seed an albumose, abrin, was isolated, while from the castor bean a similar compound ricin was obtained. Some idea as to the intensely poisonous action of these toxic proteids may be obtained when we consider that 1-100,000 G. of abrin suffices to kill an animal weighing one kilogram. Or, in other words, 1 g. of this substance is sufficient to kill 200,000 guinea-pigs, each weighing one pound. The calculated fatal dose for a man weighing 130 pounds would be about 1-100 of a grain.

Again, Fraser has shown that 0.18 mg. (1-350 grain) of the cobra venom is fatal to a one kilogram rabbit. It is at least 16 times more powerful than the venom of the rattlesnake.

Intensely poisonous substances be-

longing to the proteids were therefore obtained from certain animals, namely serpents, from higher plants and from the lowest of plants, namely bacteria. The products of the latter, owing to their great importance, are of course the most interesting, and have therefore been studied more diligently. The French bacteriologists have always held that the poisonous property of the bacterial proteids was not inherent in the proteid molecule, but was due to mechanical admixture of an unknown poison. Thus it was pointed out that if a precipitate of calcium phosphate or aluminum hydrate is produced in a culture medium the poison or a part of it is mechanically dragged down with the precipitate. The bacterial proteids from this standpoint are to be considered as an intimate mixture of an inert proteid and the active poison. It is possible for the proteids that are elaborated by bacteria to possess poisonous properties of their own, but from what is known to-day it is more likely, as in the case of the ptomains, that the real poison of our bacteria belongs elsewhere.

Brieger and Cohn in 1893 directed their attention to the isolation of the poison of the tetanus bacillus in as near a pure condition as possible. After filtering the tetanus cultures through porcelain the filtrate was treated to saturation with ammonium sulphate. This throws out of solution the poison as well as proteids and other substances. After treatment with lead acetate and after dialysis to remove these various impurities, the poison was obtained as yellow, readily soluble flakes. It was so pure that it no longer gave proteid reactions. It contained no phosphorus and only unweighable quantities of sulphur. This therefore settled, at least negatively, the nature of the tetanus poison. It was not a bacterial proteid and it was not a ptomain. In its purest condition this tetanus poison was no longer precipitated by ammonium sulphate. This does not mean that the poison was chemically pure, for such probably it was not. Nevertheless, in this condition it was so poisonous that five hundred millionths of a gram was fatal to a 15-gram white mouse. To make this astounding figure a little more intelligible, we will say that a mouse weighing half an ounce is surely killed by a dose of this purified poison amounting to $\frac{1}{11\,250\,000}$ of a grain. The calculated fatal dose for a man weighing 155 pounds (70 K) is $\frac{1}{250}$ grain (0.23 mg.).

The tremendous activity of this poison is without an equal in the whole range of toxicology. It is the study of poisons of this kind that teach us, above everything else, of what fearful weapons bacteria are possessed. It is possible from this to understand how the tetanus bacillus, localized in a small wound in the body, is capable of producing most powerful effects in the entire organism.

In the diphtheria bacillus we have an organism which in its power to produce intensely poisonous products stands close to the tetanus bacillus. The poison of both of these germs is found especially in solution in the liquid in which the germs are grown. As already stated, the active agent of the diphtheria bacillus is not a ptomain. It is something else. Roux and Yersin believed it to be an enzyme or soluble ferment, whereas Brieger and Fraenkel, from their work in 1890, concluded it was a toxalbumin. Is it, however, a proteid substance, an albumin? Or is the proteid substance that is precipitated from a filtered culture of the diphtheric bacillus merely a drag-net, which mechanically carries down with it the real poison, which itself is non-proteid? The latter is undoubtedly the case, for the poison can be thrown out of solution by the production of a precipitate of barium sulphate or calcium phosphate in the original culture liquid. The poison, as in the case of tetanus, is precipitated by ammonium sulphate. By repeated purification it has been obtained fairly pure, so that 1 mg. ($\frac{1}{65}$ grain) sufficed to kill a guinea-pig. That it is much more poisonous than this there can be no doubt. In its purest condition, as obtained recently by Brieger, it fails to give proteid reactions. Furthermore, it dialyzes quite readily through parchment paper. These facts, then, conclusively show that the diphtheria poison, like that of tetanus, is not a proteid substance.

From what has been said of the poisons of the diphtheria and tetanus germs, it is evident that soluble, intensely poisonous products are produced during the growth and multiplication of bacteria.

It was formerly supposed that these poisons are formed outside of the bacterial cell, by ferment action on the nutrient substances in the culture medium. That is to say, that they are cleavage products in the sense that albumoses and peptons are cleavage products, resulting from the action of pepsin on proteids. This view, in the light of our present knowledge, must likewise be abandoned.

The studies of the past few years have clearly shown, (1) that the bacterial poisons are not cleavage products, resulting from the breaking down of proteid matter; (2) that they are not proteids in nature, and (3) that they are not ptomains. So much for what they are not. What then is the nature of these mysterious, powerful, poisonous substances, elaborated by these wonderful microscopic forms of life? It must be confessed that at present we do not know what they are. The characteristic poison of a germ has as yet not been obtained in a condition of absolute chemical purity. An ultimate analysis is therefore impossible. The properties that these poisons do possess are so marked, so characteristic, as to leave no doubt that we have to do with an entirely new group of chemical products. Goethe says: "Denn eben wo Begriffe fehlen da stellt ein Wort zur rechten Seit sich ein." And so it is with these products; we know nothing of their nature, but to cover this void in our knowledge, we invent a term and call them *Toxins*. The word toxin, of course, has been used to designate poisonous substances in general, but in the case of bacteria it is given a restricted meaning. It denotes the specific poison of the germ the nature of which is wholly unknown.

As previously stated, the bacterial toxins are not cleavage products. They are not produced by analytic changes. On the contrary, they are to be considered as synthetic products, built up, elaborated from the food material furnished the germ. Synthetic changes are carried out *within* the lining of the cell, not without. It is therefore inside of the bacterial cell that these poisons are formed. In other words, every bacterial cell is itself a poison. In order, however, that this poison shall act on a living body, it is necessary for it to pass into solution, to leave the cell wherein it was elaborated, and to diffuse outward into the surrounding medium. With some germs, notably the tetanus and diphtheria bacilli, this outward diffusion of the poison readily takes place. As a result, the liquid in which these germs are grown acquires enormous poisonous powers, owing to the soluble poison which they contain. On the other hand, there are many bacteria in which this outward diffusion or dialysis of the poison does not readily take place. This is true of the germs of cholera, typhoid fever, hog cholera, anthrax, etc. In such cases the toxin remains stored up within the cell, and it can be obtained from these only by special procedures. The filtered culture liquids in such cases are but feebly poisonous.

The anthrax bacillus, as stated, is one of those germs where the specific toxin is stored up within the cell and leaves it only under special conditions. Marmiér, for instance, has shown that the anthrax bacillus, if grown at the temperature of the body in a good nutrient medium, that is, under conditions which are the very best for the healthy growth of the germ, gave off but little of its toxin to the surrounding medium. The filtrate from such a culture is but feebly poisonous, and when examined for a toxin yields but very small amounts. On the other hand, if the same germ is grown under adverse conditions, such as a low temperature and an unfavorable soil, the filtrate became exceedingly poisonous, and on chemical examination gave a large amount of the specific toxin. It would seem that the anthrax bacillus, when grown under the healthiest conditions, retains nearly all of its toxin within the cell. The conditions are so favorable that but few of the cells die, and hence but little poison passes outward. The cells must die, disintegrate, in order that the toxin shall be found in solution in the culture liquid. This is exactly the condition that exists when it is forced to grow under unfavorable conditions. The cells are struggling for their existence, many of them die, and as a result the filtrate becomes highly toxic. These conditions may prevail in the living body. Thus, in the guinea-pig, the anthrax bacillus is found always in enormous numbers, whereas in the

white rat it is often difficult to find, and yet in both cases death is the result. The explanation of this seeming paradox undoubtedly lies in the facts given. In the guinea-pig the conditions are favorable, the germ vegetates abundantly, and hence gives off but little of its toxin, whereas, in the rat, it is struggling for its existence, more of the cells die, hence more of the poison passes into solution. From cultures of the anthrax bacillus a ptomain has been obtained and likewise poisonous proteids of the albumose group. But, as already stated, the ptomains and bacterial proteids are but of secondary importance in the causation of the disease. In anthrax a much more powerful toxin has been demonstrated by Marmiér. It was obtained, as in the case of tetanus and diphtheria, in a sufficiently pure condition to show that it was not a proteid substance. In many of its properties this toxin is quite different from those already mentioned. Thus, the temperature of boiling water, which almost instantly destroys the toxins of diphtheria and tetanus, the venoms of serpents and soluble ferments, has but little action on the toxin of anthrax. By repeated injections of the toxin immunity can be conferred. This is true, indeed, of nearly all toxins.

The poisons of the germ of Asiatic cholera have likewise been studied very carefully. Brieger, nearly ten years ago, obtained the ptomains, cadaverin, putrescin and methyl guanidin from culture of the germ. Subsequently, with Fraenkel, he described a proteid poison. According to Petri the poison of the cholera germ is a pepton and a similar pepton, though much more poisonous, was isolated by Scholl. It is highly probable, however, that in both these cases the pepton contained as a mechanical admixture the specific toxin, which is itself non-proteid. Brieger has lately shown that it is not precipitated by ammonium sulphate, which fact is true of the purified toxins already mentioned, and moreover, that it does not give the biuret reaction. The cholera toxin, like that of anthrax, is retained within the cell under ordinary conditions. The filtrates from cultures of the germ possess only a weak poisonous action. The toxin is a very delicate substance, readily converted by apparently harmless chemical manipulations into secondary products, which may likewise be poisonous, though to a less degree than the original toxin.

The bacillus of typhoid fever likewise produces and stores up its toxin within the cell. So far as the chemical study of this germ is concerned, we may say that it has yielded results similar to those of the cholera and tetanus germs. At first a poisonous ptomain, typhotoxin, was described; subsequently a poisonous proteid was met with. This, as in the preceding instance, is probably but a mixture of an inert proteid with the real specific toxin. The colon bacillus, which is so difficult to distinguish from the typhoid germ, gives products which must be quite similar to those of the typhoid germ as immunity experiments with these two germs have shown.

The poison of the tubercle bacillus is likewise primarily stored up within the cell, as the experiments of Prudden and Hodenpyl clearly indicate. With dead tubercle, thoroughly washed to remove all traces of soluble products, they were able to induce in animals pathological changes similar to those produced in the disease. When the tubercle bacillus is grown artificially on liquid media for some time, more or less of the active toxin passes into solution. This liquid filtered and concentrated, is what is known as tuberculin. A poisonous ptomain and a proteid of the albumose group has been found in this liquid, but the specific toxin is for the most part still unknown.

In general, we may say, that the toxins produced by bacteria are exceedingly unstable compound. A chemist may start out with a very poisonous liquid and long before he is through with the necessary chemical manipulations only inert products remain. Let us inquire briefly into the characteristic properties of these toxins. Sunlight, and even ordinary diffuse daylight, possesses a marked destructive action on these substances. A highly poisonous tetanus filtrate exposed to the sunlight for a few hours becomes innocuous. This is also true of the diphtheria toxin, and indeed of all of the bacterial toxins. It is desirable, therefore, to keep such

solutions in the dark. Heat possesses even a more marked action. Toxins, as a rule, are very sensitive even to moderately high temperatures. Boiling usually promptly destroys these poisons. The tetanus toxin is so sensitive to heat that at 65° C. it is destroyed in five minutes.

Dilute acids and alkalies likewise exert marked destructive action. Thus a half per cent. hydrochloric acid within an hour destroys the tetanus toxin. Hypochlorites readily destroy the toxins. Even alcohol on prolonged contact tends to convert these substances into inert products. Furthermore, the toxins possess an exceedingly important property, with reference to the production of immunity. Repeated injections with gradually increasing doses of the crude toxin or filtrate establish in time in the body a condition of immunity. As is well known, the horse is immunized against diphtheria in the preparation of antitoxin by repeated injections of the filtered diphtheria culture. Some have assumed that bacteria gave rise to two groups of products, an immunizing substance and the toxin. This supposition, however, is not necessary since, with purified toxins, immunity can be induced.

We cannot leave the subject of bacterial toxins without pointing out the remarkably close resemblance that these products bear to the venom of serpents and to the so-called poisonous plant proteids. The most active venom is rendered inert by heat, even considerably below the boiling point. Acids, alkaline hypochlorites, gold chloride, iodine, etc., soon destroy the poisonous property. Introduced into the stomach, all three of these poisons are comparatively harmless. A quantity, a hundred times greater than the amount necessary to kill instantaneously, must be given by the mouth in order to produce fatal results. Immunity to all bacterial toxins, venoms and plant proteids, can be established by essentially the same method of experimentation. The blood of the animals thus immunized, possesses antitoxic properties. The antitoxins of diphtheria, tetanus, streptococcus, etc., are well known. Similarly, a horse immunized against the venom of a serpent yields an antitoxic blood serum, which protects not only against the venom employed, but against all other venoms.

This last point is one of great importance in the study of immunity. Closely-related organisms give rise to closely-related, if not identical, chemical products. The venom of a rattlesnake, therefore, though many times less active than that of the cobra, is, nevertheless, generically alike. It is because of this similarity and chemical relationship between the active poisonous constituents of the disease venom that it becomes possible to have one antitoxic blood-serum which will do equally well for the cobra, rattlesnake and viper venom.

Among our bacteria, however, there is, as a rule, no such real relationship and consequently there is no close relationship between the respective toxins of various disease germs. We are accustomed to classify bacteria upon most arbitrary grounds, the mere external form of the organism. It is evident that while a bacillus may resemble another bacillus in form and size, after all, the two are wholly unlike generically. This, indeed, is more often the case. For this reason we have a specific toxin of diphtheria, a specific toxin of tetanus, another of anthrax, and still another of typhoid fever. These toxins may possess similar reactions, but chemically and physiologically their relationship is very remote. It follows, therefore, that we must have specific antitoxins to cope with each one of these bacterial poisons. The diphtheria antitoxin acts only against the diphtheria poison, not against tetanus or anthrax. In the same way the tetanus antitoxin is useful only in tetanus, not in diphtheria.

In the case of the streptococci, however, I believe that we have organisms that are naturally closely related, as much so as the various serpents. It follows, therefore, that their toxins are likewise closely related. The streptococcus antitoxin consequently protects equally well against streptococci of whatever provenience. The streptococcus antitoxin is, therefore, not specific for one organism, but for an entire group of related forms. This explanation has more in its favor than that advanced by Marmorck and others that all streptococci are identical.

What are antitoxins? where do they

come from? and how do they act? are questions of great interest. We are thoroughly familiar with what an antitoxin is capable of doing, but when we attempt to answer these questions we find ourselves largely in the field of speculation. We have seen how little is known regarding the true nature of the bacterial poisons. We know even less regarding the nature of antitoxins. As to their source, it is safe to say that they are products given off by certain cells of the body under the influence of the bacterial poison. The primary constituent of the nuclei of cells is an exceedingly complex body known as nucleohiston. This substance readily decomposes into nuclein and into histon. These two products possess antagonistic powers. Thus, nuclein hastens the coagulation of blood, whereas histon prevents this change. It is possible that the antitoxic principle is allied to histon; at all events, it has been shown that histon acts like antitoxin against the poison of diphtheria.

Antitoxin was supposed by Behring to act strictly as a neutralizing agent, in the same way as an acid neutralizes an alkali. But Buchner and Roux have advanced proofs which go to show that such is not the case. Antitoxins do not neutralize directly the bacterial toxin. They do, however, stimulate the cells of the body in some way so that these take up the struggle and carry it to a successful close by destroying the germ and rendering the poison inert.

WHAT CAN BE DONE IN CASES OF ACUTE AND SUB-ACUTE CATARRHAL OTITIS MEDIA.*

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I regret that opportunities for the study of the ear and its anatomy in the dissecting-room are limited; still, if the desire is strong, one can study the comparative anatomy of the ear readily by obtaining the head of a dog, cat, or rabbit, which by careful dissection will be of great value; and in the more recent works for use in the dissecting room will be found very good illustrations of the anatomy of the ear—a very great improvement over the old books. You will find this knowledge of great importance when you enter upon the practice of your profession, for it will be found that from one to two per cent. of all cases will be affections of the ear.

A reference to our book,‡ in which are numerous tables, will show that catarrhal otitis media—acute, sub-acute and chronic—presents the largest number of cases of all diseases of the ear which we are called to treat.

The chief cause is *cold*, applied to various parts of the body, but especially to the nose, throat and pharynx. Thence it affects the eustachian tubes, producing what is known as tubal catarrh, or, as it is also termed, acute salpingitis of the eustachian tubes. The condition is also developed as a sequel of the exanthemata, especially of measles and of scarlet fever.

A predisposing cause is the presence of adenoid vegetations, which are found back of the pharynx and which can be detected by the finger. These become engorged with blood and compress the orifices of the eustachian tubes, causing changes in its caliber, and, ultimately, disease of the lining membrane of the middle ear. When the eustachian tubes become obstructed from any cause, the air contained within the cavity disappears quite rapidly by absorption, and deafness results. The unequal pressure on opposite sides of the drum membrane drives it inward, carrying with it the ossicles of the ear, especially the stapes, with such force as to produce deafness through compression of the fluid which makes its impress on the expansion of

*Abstract of a Clinical Lecture delivered at the Jefferson Medical College, November, 1895.

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‡Clinical Manual of Diseases of the Ear.

the auditory nerve, and the rods of corti which convey sounds to the brain.

The chief symptoms are a feeling of stuffiness with heaviness of the head and ears—with a desire on the part of the patient to insert the finger into the meatus to relieve the itching and pressure. There is a sensation of pain along the upper part of the throat, pharynx, region of the tonsils and root of the tongue. The hearing is impaired, with loud noises in the ear. Examination of the nose often shows the turbinated bones swollen and enlarged, and pressing on the vomer and eustachian tubes.

Diagnosis—Physical Examination: The drum membrane is depressed and drawn inwards; the inferior segment broadened from above downward, while the transverse diameter is increased; the handle of the malleus is foreshortened, the short process prominent; both anterior and posterior folds are exaggerated. The color of the membrana tympani is but slightly changed, and in the early stages is almost normal.

In some of the cases it is quite difficult to arrive at a diagnosis, and therefore the aid of all the other means in our power are brought into use.

First examine the nose, and especially the middle and inferior turbinated bones. To prepare this part, employ a ten-per cent. solution of cocaine, passing it carefully back, to determine whether the swelling is temporary or permanent. If it is temporary it will disappear under the influence of the cocaine, but if a real hypertrophy it will remain. In introducing the catheter, illuminate the nostrils.

Functional Examination: We employ the aural speculum, forehead mirror, Politzer's air bag and the catheter. If these are not sufficient to give us the clue to the diagnosis in the chronic form of non-suppurative otitis, this is to be obtained by careful tests of the hearing. Indications of depression of the membrana tympani are of value and should not be neglected, but when absent, greater weight must be placed on testing the hearing power of speech, tuning-forks, etc.

According to Wolf, speech has a compass of five octaves, from E to C. The deepest tone is that of *r* lingual; the highest is *s*. The greatest strength of tone, and the most timbre belongs, according to Wolf, to the vowel *a*, which can be heard at 252 m., and the smallest to *h*, a sound heard at 8.4 m. distance. The vowel sounds are generally perceived more surely and at a greater distance than the consonants. Ordinary conversation is used, as well as whispering. The average normal hearing distance for whispered words in a quiet room is 25.26 meters—during the ordinary noise of the day, 20 meters. The determination of the lower register for tones is by ærial conduction, and the tests go by the names of their discoverers: Schwabach, Rhinne, Weber, Galton, Koning's rods.

The first has found that where obstruction exists in the conducting mechanism, the absolute period of bone conduction exceeds that of the normal ear.

What is termed the test of Rhinne, is based on the fact that the normal ear perceives a vibrating tuning-fork, held before the auditory canal of the ear, about twice as long in time as when the shank of the fork rests upon the mastoid process. If the canal was occluded, or where an obstructive lesion was present within the tympanum, it was found that after the fork had ceased to be heard in front of the ear, its vibrations could still be recognized when the handle of the instrument was brought in contact with the mastoid. In arriving at these tests it is well not to use a tuning-fork of a pitch lower than 512 vibrations. If we use a very low-pitched fork, the patient will not hear it, but only feel it.

E. H. Weber's experiment proved that a vibrating tuning-fork placed against the teeth or on a point of the cranium, is heard with normal ears better when the external auditory canals are closed than when they are open. His method is to place a vibrating fork upon the skull and observe whether the sound is heard more or less loud by the ear under examination than by the other ear. If a tuning-fork placed on the vertex be heard better by that ear which is the deafer to ordinary sound-conduction through the air, it may be concluded that defects exist in the sound conducting apparatus on that side. Such defects are more apt to be benefited by treatment than are those affecting the sound-perceiving apparatus.

Then we have a very shrill whistle, invented by Galton, of England, and brought into use in 1878 for testing the upper part of the scale, employed for the perception of high notes. It consists of a small covered cylindrical whistle, which is lengthened and shortened by a valve moved by a micrometer screw. The lower part of the valve is in connection with a hollow cylinder which extends over the cylinder of the whistle. On the side of the whistle is a scale to show the tens, and around the hollow cylinder a scale to show the single number. The blowing of the whistle is done by a small rubber balloon.

Besides the Galton whistle we have employed for testing the upper limit of the perception of hearing, a series of Konig's cylinders of steel, of from 20,000 to 100,000 vibrations per second, with intervals of 5,000 vibrations. Testing with the high-pitched tuning-forks, Galton's whistle and Konig's rods will yield good results only when the difficulty of hearing affects both sides, and is of long duration. The perception for these high tones also decreases with old age.

Treatment consists first, in restoring, if possible, the nose and throat to the normal condition by the use of an alkalin spray of hydrogen dioxide, and, with a solution of iodine grs. x, potassium iodide grs. xxx, and glycerine one ounce, touching back of the palate with a delicate probe, tipped with absorbant cotton; and, second, opening the eustachian tubes, and keeping them open. This latter is usually accomplished, in the adult, by Politzer's method. In children, we employ a simple tube, and by blowing into the nose when closed, the crying of the child opens the canal. If you should not succeed in keeping the eustachian tube free by Politzer's air bag, it can be supplemented by the use of various vapors, etc. Resort is then to be had to the eustachian catheter with a much greater pressure than that of Politzer's air bag, say ranging from ten to twenty-five pounds. The catheter is depressed and passed into the pharyngeal orifice of the tube, held firmly by an assistant or head band, a metallic tip is fitted with a valve and is so arranged as to fit into the catheter and into the spray apparatus, with a long elastic tube connected with the spray machine. This tube is then compressed at intervals with the finger so as to produce a massage of the eustachian tube and small bones of the ear. Perform the inflation and massage slowly and with great care for fear of tearing the delicate mucous membrane. If there is much pain and tenderness it will be proper to abstract from two to four ounces of blood in front of the tragus, either with the artificial leech or by very small cupping glasses. The objection to natural leeches is they are difficult to procure, require too much time, and bring to the parts too much blood.

If these means are not successful there is apt to follow effusion of fluid into the cavity of the middle ear. This is sometimes removed by adding to the treatment above, the use of large doses of acetate or iodide of potassium, commencing with five grains, three times a day in water, and increasing every day, watching carefully not to produce iodism. If this form should not agree with the patient, resort can be had to the syrup of hydriodic acid. After this method has been employed for some weeks and there is no improvement, we notice a dark line which shows the fluid is still on the increase, and the movements of the head changes its position, and even small bubbles can be seen as we inflate the ear. Remove this fluid by evacuation by an incision into the lower portion of the membrana tympani under careful antiseptic precaution. If a free opening is made we can pass various fluids, as pure liquid vaseline, with or without paraffine. After free drainage and cleansing with the solutions of Dobell or Seiler, and after a time a very weak solution of the nitrate of silver. Still there are some objection to fluids, for fear of being retained and entering into the mastoid cells. On this account of late years we have come to prefer the vapors of various agents.

If the cases are of recent origin, or even what I term sub-acute, our success is often very favorable, but if chronic with profound deafness, the progress is slow.

A safe preparation as a basis of all the volatile products is pure liquid vaseline or albaline. To force this and others

into the middle ear through the eustachian catheter a more powerful force, as we stated, has to be employed than the ordinary Politzer bag or any of the spray producing hand appliances. I have employed for several years, an air pump worked with the foot, which has a pressure of from one to twenty pounds with a rubber tube spray apparatus and silver eustachian catheter. With this apparatus we are able to relieve, and even cure, many of these cases in which the disease has not advanced beyond the sub-acute stage or chronic sclerotic cases. We consider that great advance has been made in the surgical treatment of this class of cases, the evidence of which has been exhibited in this hospital since May, 1895, both by myself and Dr. S. McCuen Smith.

The patient must be willing to submit to a certain number of treatments, as follows: At first this process is to be repeated daily for from five to ten minutes, for either ear, and afterwards every other day, for a month or six weeks.

The following formulæ have been employed with success by a friend (H. V. Wardemann, Milwaukee, Wis.,) and myself, for simple aural catarrh or eustachian salpingitis:

1. Pure liquid vaseline.
2. Benzoinol (W. H. S. & Co.'s) . . . 100
3. Thymol 50
   Eucalyptol (Merck's limpid) . . . 1
   Benzoinol (W. H. S. & Co.) . . . 100

4. Where attended by much tinnitus, the above, or

   Camphoræ res 2.50
   Menthol crys. 2.50

Mix.

Triturate until clear oil forms, add benzoinol ad. q. s. 100.

If we have a perfectly free bellow's murmur, indicating an abnormally dry state of the middle ear cavity, we resort to formula No. 6. This is not as painful as some of the more powerful preparations.

No. 6. Menthol, gr. v.
Eucalyptol, gtt. viii.
Benzoinol, f℥j.

Another of these preparations to be employed in dry catarrhal affections can be also used at home by the patient with Politzer's bag or the Globe spray apparatus when the patient is properly instructed:

No. 7. Oil eucalyptus, ℥ij.
Oil cassia, Minims 40.
Oil gaultheria, Minims 40.
Menthol crystals, gr. 40.
Liquid vaseline, f℥iv.

Mix.

In a former lecture we dwelt upon the chronic form of otitis-media; what the patient expects and what we are able to do for his relief.* Also the importance of aural massage with the Seegle pneumatic otoscope as modified and improved by Dr. Charles Delstanche, of Brussels; with a series of original experiments with the various vibrometers and other sounding instruments, showing how little value they were in either relieving deafness or tinnitus aurium,** indeed in some instances producing the diseases in the ear which they professed to cure.

THE UNRELIABILITY OF PROVERBS.—A visitor was lamenting the waywardness of a young friend, and concluded by saying: "After all, it but proves how true are our old proverbs, 'One man can take a horse to water, but twenty men can't make him drink.'"

"You can't prove anything by a proverb," answered the lively girl who listened. "Or, rather, you can prove anything upon earth you wish. Here's a proverb that answers yours back, 'A bird that can sing and won't sing must be made to sing.'"

"Try it again," laughed the first speaker. "'A rolling stone gathers no moss.'"

"Easy enough," answered her companion.

"'A sitting hen never gets fat.' When you tell me, 'A penny saved is a penny earned,' I answer, 'You may be penny wise and pound foolish.' And if you say, 'Speech is silvern, but silence is golden,' I can reply, 'A word is better than a wink—to a blind horse.'"

"And what do you say to this?" asked the other, demurely, "Proverbs are the wisdom of nations."

"Easy enough," retorted the other. "'Borrowed wisdom is too cheaply got.'"—*Harper's Bazar.*

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*See *Journal of the American Med. Asso'n*, October 26, 1896.

**The *Medical News*, December 1, 1896.

COMMUNICATIONS.

EXERCISE IN PHTHISIS.*

LLEWELLYN PHELPS BARBOUR, M.D.,† TULLAHOMA, TENN.

In no other way are such serious mistakes made in the management of phthisis, as in the matter of exercise. Instructions to "take all the exercise possible," "be on horse-back all day," "walk off the fever," are continuously given by many members of the profession, even to this day. These instructions are two hundred-year-old reverberations of Sydenham's emphatic statement, "But of all the remedies for phthisis, long and continued journeys on horseback bear the belt. This too, not only in mere cases of cough and weakness, but after wasting night-sweats and exhaustive diarrhœa have signified the near approach of death."

This suggestion of Sydenham is quoted with approval by Dr. Whitaker in Buck's Reference Hand-book of the Medical Sciences, though he of course grants that Sydenham's ideas of the pathology of phthisis were very crude, and condemns his therapeutic remedies as cruel. A moment's consideration of the various pathological conditions and complications of the disease, as seen in the light of modern research, will show that advice to long-continued exercise in phthisis, or any exercise at all in an advanced stage with night-sweats and hectic fever, is as crude and cruel as anything that Sydenham has ever taught.

Before reviewing the pathology, one word as to predisposing causes. I believe that a small or weak heart is a very frequent factor in predisposing to phthisis. Not a constant one perhaps, but frequent and important. That this is true, I am compelled to believe by the teachings of my own observations; and it is in accord with the investigations recorded by Dr. Brenner and others, who wrote before the discovery of the specific germ. Since that time there has been too little discussion of predisposing influence, and the matter has not been given the attention it deserves. Families with a marked predisposition to consumption almost always have a feeble circulation as a family inheritance. Be this as it may, the first pathological condition in phthisis is a tubercular deposit in the lungs. Such a deposit must obstruct the free passage of blood through those organs and embarrass the heart to that extent.

Now a weak heart, whether congenital or acquired, may find itself over-taxed by a comparatively slight area of deposit, especially if the patient still further burdens the organ by exercising at all severely. I have had a patient under my care during the past year, in whom the right side of the heart had dilated until there was incompetency of the tricuspid valves, although the tubercular deposit was confined wholly to the upper lobes of the lungs and chiefly to the apices. With more extensive areas of obstruction the danger of over-taxing the heart becomes of course greater, and when to the burden of obstruction is added the depressing effects of a fever, we can see at once that the danger of heart failure is imminent. The condition is then exactly similar to that in pneumonia, and exercise would be just as advisable in the one disease as in a similar condition in the other. It is only by increased strength of its muscular structure that the heart is enabled to throw blood through the obstructive deposit, and at the same time meet the extra demands upon it called for by considerable exertion. This increased nutrition of the cardiac muscle cannot be expected during the progress of a wasting fever. Hence, even after the fever has ceased and nutrition has improved, the patient needs to be kept quiet, only

*Abstract from *Nashville Journal of Medicine and Surgery*, March, 1896.

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slight exercise allowed and the effect of that little carefully watched, until happily the heart has gained sufficient strength, if need be has become hypertrophied and equal to its task. Of the pathology of recent tubercular deposit it is noticeable that its blood supply is very scant. It is maintained by some pathologists that the natural tendency of this deposit is to necrosis and caseation. By others that the tendency is to a fibroid metamorphosis. There is truth in each. When the destructive course of the morbid process is met by the recuperative force of vigorous vital functions, we have the blood supply to the parts maintained and increased. Absorption of a considerable portion of the deposit may then occur, and such as is not absorbed changed to the less harmful fibroid condition. But if the circulation is feeble and the blood supply fails, necrosis of course occurs.

Our efforts then must be to maintain and increase the circulation and promote nutrition. Exercise of course increases the force of the circulation, but only so far as the heart is able to meet the demands. Just as surely as the heart is over-taxed it is enfeebled, and then, instead of increased circulation at these points where it is so desired, we may have it cut off altogether. Thus extensive tubercular deposit and especially areas of complete consolidation furnish another reason why exercise should not be severe or prolonged. I have seen one single instance of indiscretion of this kind, one long walk up a mountain, result in the formation of a cavity in this way. Again, the walls of the blood-vessels in the tubercular area are apt to become weakened by sharing in the tubercular infiltration. The violent exertion that the heart makes in its efforts to supply oxygenated blood during a mountain climb or bicycle ride, increases very materially the danger of rupture of these vessels; and in this instance the stronger the heart the greater the danger. Especially is the danger of hemorrhage from exertion great when active destructive changes are going on.

Another point concerning the pathological conditions of chronic phthisis; as the disease advances ulcers form in the bronchial tubes and cavities in the lung tissue. These cavities and ulcers furnish excellent opportunities for infection by pyogenic germs. This usually occurs, and the hectic fever with night-sweats of advanced phthisis, is nothing less than a septic fever. The system is now exerting its whole force to rid itself of these germs and counteract the effect of their toxines. It uses up all adipose and even consumes muscular and other tissues in its persistent struggle. Almost every organ in the body must share in the combat. The nerves, the heart, the lungs, the liver, the kidneys, the spleen and other glands, the skin—there is active work for each and all. Shall we put such an already over-taxed body on horse-back for "long and continuous journeys?" What surgeon would advise exercise when these germs had found access to the system through a wound; or what obstetrician would let his patient out of bed when they entered through the parturient canal? Rest is here the first indication. Rest as complete as possible. Conservation of every vital force. Nor should we wait until the fever is high, but meet a slight infection with the same precautions that we do in septicæmia through other avenues. With the thought of being out of doors I am in perfect accord, and on pleasant days these patients may be placed on cots and carried out of doors. Still if the patient's room is what it should be, sunny, well-ventilated and free from dust, it matters little except for the relief a change may give. The pure air is what we want.

I think I have shown clearly the dangers of active exercise in many conditions of phthisis. I hope I have not been understood to oppose all exercise in any condition. I do oppose violent or long-continued exertion by any phthisical patient, and for some individuals in a neurasthenic condition the rest cure as enforced by Weir Mitchell affords the best possible chance for recovery. But in most cases, as the contra-indications disappear, as the tubercular deposit becomes absorbed or is otherwise disposed of, as the heart gains strength and the fever ceases, gentle exercise is to be permitted and advised; but always with care and caution, and its effect upon circulation and temperature carefully noted. The exercise must be always carefully adapted to the condition of the

individual. Here a word of warning. Few patients, even those from the ranks of the profession, can be trusted to decide this matter for themselves. They should always be under the care of an experienced medical man. Especially should this be the case when they are sent away from home. The usual hopefulness of consumptives leads them to overestimate a slight improvement, and after a few days of feeling well they conclude they are equal to former tasks. To feel well is not necessarily to be well, in consumption of all diseases. The form of exercise is of considerable importance. That which keeps the mind pleasantly employed is always best. Exercise taken for its own sake and without agreeable mental stimulus, taxes the nervous system much more severely.

To the patient allowed only slight exercise carriage driving is always agreeable and can be permitted those quite weak. Carriage driving, walking, any form of exercise, should be taken in pure air when possible, and not in smoky city streets, or even on dusty country roads. Walking is one of the best of recreations, and, fortunately, cheap and convenient. But there are different ways of taking walks. The man from the city office who has not learned to study nature, but who strikes out hurriedly, his eyes on the ground, intent only on taking a certain amount of exercise, profits but little in health and pleasure compared to him who saunters off leisurely, stopping to listen to a solo from the throat of a thrush, or to study the habits of a mole burrowing in a meadow. The disagreeable man of Miss Harraden's story advised his fellow invalids to study cheese-mites. He gave practical advice; but for out-door patients a Field-Book of Botany is a better prescription, leaving the cheese-mites for stormy weather.

One needs to be fertile in resources of this sort. It may seem like little business for a busy doctor to take time to teach his patients how to take a walk, but he who successfully combats this disease must take advantage of every detail that will make for improvement. Hunting and fishing are to be commended as pleasurable and interesting forms of exercise, but in the very fascination there is danger. The excitement of the sport is too apt to lead to overexertion and harmful exposure. Mountain climbing must be left entirely to those with strong hearts and comparatively slight pulmonary lesions, and then done carefully and with frequent rests. Horse-back riding is mentally and physically exhilarating to most people, and, if properly indulged in, is one of the most useful adjuncts in the hygienic management of phthisis. But Sydenham's exaggerated emphasis of it was unreasonable. That exceptional cases of phthisis have recovered, though put on horse-back while weakened and hectic, I do not dispute, though I have never seen such a case. And I have seen a woman get up a few hours after child-birth, pass through an attack of puerperal fever, and not take to her bed. The same common-sense and good judgment should rule in the horse-back riding of the phthisical as in other diseases and other forms of exercise.

Bicycle riding I shall only mention to condemn. The danger of over-exertion is too constant to think for a moment of allowing it. Hills will get in the way, and friends will challenge to a long run or to a swift spurt. Indoor gymnastics are advisable only when the weather is such that the patient cannot get out. Nothing violent ought ever to be allowed. Dumb-bells and Indian clubs should be very light, and used only for a few minutes at a time. Special breathing exercises are of value in increasing the strength of the respiratory muscles. For this purpose I find the Brooklyn pneumatic cabinet furnishes the best results; and while this is perhaps the least important of all the good results obtained by the cabinet, it is certainly not insignificant.

Whatever form of exercise is used, we should continually bear in mind and impress upon our patients the thought that exercise is valuable only as it promotes the process of repair and construction. The rest that follows action is Nature's time for the nutritive process. The man in health, to retain his health and strength, must have periods of rest. Much more does he need rest who is weak and feeble, whose nutritive functions are impaired. And the feebler the patient the shorter should be the time of action, the more frequent the periods of

rest. The most perfect rest is obtained during sleep. One of my routine prescriptions is an afternoon nap. Morpheus is frequently shy in his attention to these sufferers and needs to be courted. This is to be done by every hygienic device possible, but not by drugs, except as a very last resort. I will conclude with four short rules that should be continually ringing in every patient's ears:

Don't get tired.
Don't get out of breath.
Don't cause violent heart action.
Rest often.

[We would make only one criticism of the above, which, in the main, is admirable, *i. e.*, the paragraph in reference to bicycle riding, which the author only condemns because of the manifold temptations to abuse. The same objection might be made to horse-back or any other kind of exercise, or to any of the familiar drugs—strychnia, opium, etc. A thing which is acknowledged by many to be one of the strongest and most beneficial therapeutic measures should not be condemned because of the chance of its abuse.—ED. M. AND S. R.]

CURRENT LITERATURE CONDENSED.

Thyroid Medication in Myxœdema.[1]

Quite recently hearing statements somewhat at variance, the author was tempted to make research and give in a short article a resumé of thyroid medication in myxœdema.

1. Grafting of the gland has always led to notable but indefinite amelioration, the grafted gland becoming reabsorbed and its action being only transitory. 2. Hypodermic injection has led to a number of apparent cures, but there was usually recurrence. 3. Ingestion of the gland is generally supposed to have been first practiced by British physicians, but the credit belongs to Dr. Howitz, professor of clinical surgery at Copenhagen. The alimentary mode of administration differs in different countries. In Denmark and Germany the glands are usually decorticated, cleaned, and slightly cooked and hashed. They are generally taken in the water in which they were slightly cooked, or in bouillon. An adult, during the first three weeks, takes four lobes daily, a rather large dose. Then for three weeks the treatment is suspended. For two weeks three lobes are taken daily. Then again a suspension for twenty days should follow. Finally two lobes are given every other day. In Great Britain one gland is cut in round pieces and put in a few tablespoonfuls of water for half an hour. It is strained through muslin and the filtered part administered in beef tea. This is given daily for one month, after which only one-half a gland is given. Others merely broil the gland slightly and give it so. Fox believes that only a slight and rapid cooking is necessary, for cooking alters the virtue of the gland. In France the gland is given raw in "bullets," with or without bouillon, and they usually give in this manner half a lobe daily. The thyroid has been administered also in dry extract in capsules and tablets and clinical results show that these produce the same result as the fresh gland. Though the administration by the mouth is the safest method for using the thyroid gland, it is attended with danger. Even the apparently innocuous tablets have proven fatal. The signs of reaction are *polyuria, rise of temperature, insomnia,* and *pains in the limbs,* and warn one that the remedy must be suspended.

[1] E. M. Duparquier, M.D., *New Orleans Medical and Surgical Journal,* March, 1896.

Gunshot Wound of the Brain. Recovery.[2]

The patient was a negro musician, twenty-eight years old. He walked into the hospital and stated that the day before he had been shot. A bullet wound was found just above the lobe of the left ear, the wound in the skull being in line with the external

[2] W. E. Parker, M.D., *New Orleans Medical and Surgical Journal,* March, 1896.

meatus. So far as I could see there were no cerebral symptoms, but a slow pulse. The scalp was shaved, the wound dressed antiseptically, and the patient kept quiet. The temperature remained about normal for three days, when it rose to 101°. At this time there was ptosis, paralysis of the left side of the face, protrusion of the tongue to the right, drowsiness; and the patient seemed startled when awakened. He recognized the uses of familiar objects, but had forgotten their names. No impairment of sensation was found and no paralysis of arm or leg. About noon next day the patient was anæsthetized with chloroform and five pieces of bone and a much flattened thirty-eight calibre bullet extricated. About an ounce of pus and broken-down brain matter was removed, leaving an abscess cavity about the size of a walnut. Recovery was uneventful, the amnesic aphasia passing off more rapidly than the facial paralysis. Roaring in the ear was also complained of.

A New Method in the Local Treatment of Acne.[3]

In several of the forms of acne the most speedily effective local treatment is the ring curette of the kind chiefly used by gynæcologists. With this the comedones and pustules of the face displaying the lesions of acne are raked away in a debris of pus, blood, sebaceous secretion, and epithelium, with a resulting benefit, which in many cases seems proportionate to the severity of the pre-existing symptoms.

The objections to its use are, pain and a too frequent and unnecessary wounding of the epidermis by the edge of the curette and the inapplicability of the treatment when the inflammatory products are sub-epidermic, or where the disease occurs less in pustular type than with the development of indurated papules. It has occurred to me on several occasions when making use of the curette that its value lays fully as much in the degree of massage it produced in the skin as in its action as a knife or scraper. Acting on this I lately devised an instrument consisting of a short, stout handle connected by a slender steel neck with a ball set in a steel socket, the small sphere rotating in the cup as in a ball and socket joint. When ready for treatment, the skin is first operated on with a disinfected needle and comedo extractor until all pustules and sub-epidermic foci are emptied, and conspicuous comedones removed. After this the surface is rendered aseptic with a solution of formalin, from one-half of one per cent. to two per cent., according to the sensitiveness of the patient's face. The ball is then rotated freely over the surface and deep pressure is made upon the affected regions, bringing into view groups of previously inconspicuous comedones, which are in turn removed by the comedo extractor. Lastly, a massage of the surface is practiced with the ball by the aid of salicylated cocoanut-oil, or one of the commonly employed sulphur unguents. The method is suggested as an aid, especially in indolent and intractable cases; though I believe when properly employed it may have a value in others, and possibly in other diseases of the skin than acne.

[3] James Nevins Hyde, M.D., *Journal of Cutaneous and Genito-Urinary Diseases*, March, 1896.

An Improved Method of Diagnosticating Diabetes from a Drop of Blood.[4]

The typical and practical feature of this process is that a drop of blood taken from the finger in the usual manner, by means of a needle, permits an unfailing diagnosis. The difficulty of successfully repeating the experiment lies in the complicated process requisite to the preparation of the staining fluid. The two aniline dyes, eosin and methylene blue, vary considerably according to their source, and the acidity of the former and the alkalinity of the latter are met with in shifting proportions in the different articles furnished by different manufacturers. The preparation of the specimen by prolonged heating is objectionable, because there is danger of overheating, and because of the long time consumed.

I can now announce a method nearly as quick and, I think, more reliable than the ordinary chemical one, or that by the polariscope. Dieting and the use of certain drugs will cause a disappearance of sugar from the urine, but the reaction to this test is still present. Saturated

[4] L. Bremer, M. D., *New York Medical Journal*, March 7, 1896.

watery solutions of eosin and methylene blue are mixed in about equal proportions so that a neutral point is reached, causing a precipitate insoluble in water, but soluble in alcohol. This precipitate is washed and dried on a filter and reduced to a fine powder. To it are added eosin and methylene blue in small quantities, varying according to the respective acidity and alkalinity of these dyes. The quantities have to be ascertained by experimentally testing specimens of diabetic and non-diabetic blood. Of the samples at my disposal, one-twenty-fourth of eosin and one-sixth of methylene blue were added to the dried compound, yielding a reddish brown powder. A drop of blood is spread evenly on a cover-glass and allowed to dry. Then for comparison it is placed with a similar specimen of normal blood in a wide-mouthed bottle containing equal parts of alcohol and ether. This is then placed in hot water and allowed to boil for four minutes. This is done to fix the hæmoglobin in the red corpuscles. The slips are now transferred to the test fluid, consisting of 0.025 to 0.050 of the powder dissolved in ten grammes of *thirty-three* per cent. alcohol. This fluid retains its characteristic qualities for only a few hours; so must be freshly made. In this fluid the cover slips remain about four minutes, when they are to be washed in water. The diabetic specimen will then appear sap green or perhaps bluish green, whereas the normal preparation looks reddish violet. Non-diabetic blood so spread as to form uneven ridges, will sometimes show a greenish tint. The blood of a rabbit that has received a subcutaneous injection of grape sugar an hour or two before the injection, will not give the reaction, but a cover-glass preparation of normal blood will react after being floated on diabetic urine for ten or fifteen minutes.

THE TREATMENT OF DIPHTHERIA WITH THE ANTITOXIN.

The reports of the results from the use of antitoxin in the treatment of diphtheria continue favorable when large numbers of cases and long periods of time are considered. It appears that, between the years 1889 and 1893, the morbidity of diphtheria in Munich declined from 3,092 to 2,043, the mortality ranging from between 11.76 per cent. and 13.18 per cent. According to the report of a commission appointed by the Medical Society of Munich (*Münchener medicinische Wochenschrift*, 1896, No. 7, p. 149), there occurred in the fourteen months from October, 1894, to December, 1895 (covering the period in which the antitoxin was used), 2,422 cases, with 246 deaths—a mortality of 10.2 per cent; while in the preceding fourteen months there were 2,130 cases, with 313 deaths—a mortality of 14.7 per cent. The increase in the number of cases was not only relative, but also absolute, while the mortality was reduced 4.5 per cent. It is estimated that about one-third of the cases were treated with the antitoxin. As a result of this collective investigation, the conclusion is reached that, in the large majority of cases treated with the antitoxin, the local process is checked, and the constitutional manifestations are soon and sometimes strikingly ameliorated. Permanent injury of the organisms, *e. g.*, of the kidneys, does not result, so that it is important to use the remedy early and energetically.—*Phila. Polyclinic.*

A little girl in Boston wrote a composition on boys. Here it is:

The boy is not an animal, yet they can be heard to a considerable distance. When a boy hollers he opens his big mouth like frogs, but girls hold their tongue till they are spoke to, and then they answer respectable and tell just how it was. A boy thinks himself clever because he can wade where it is deep, but God made the dry land for every living thing and rested on the seventh day. When the boy grows up he is called a husband, and then he stops wading and stays out nights, but the grew-up girl is a widow and keeps house."—*The Outlook.*

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PHILADELPHIA, SATURDAY, MARCH 21, 1896.

EDITORIAL.

SPECIALIST VERSUS GENERAL PRACTITIONER.

General practitioners, as a rule, regard specialists in very much the same light as the public regards the medical profession as a whole, namely, as an inevitable evil to whose support they must contribute, but at whom they have the compensatory privilege of leveling their shafts of satire and invective. This sentiment may be partly due to the source from which the specialist has evolved. Going back to the middle ages, we find the first specialist, the surgeon, acting as the mechanically skillful but unrespected assistant of the physician. The Chamberlens, to whom we owe the invention of the obstetric forceps, kept their discovery a secret for three generations, and advertised in the most quackish terms their peculiar superiority in relieving the parturient woman. The radical cure of hernia, the operations on hemorrhoids, the special care of the eyes and ears, originated among peripatetic charlatans. The genito-urinary and the nervous specialist have differentiated the functions of the healer of "clap" and the restorer of "lost manhood." Dermatology has but recently been claimed from the hands of the charlatan, and chiropody and orificial surgery are just beginning to be recognized as fields for

legitimate medical specialists, while one of the greatest of foreign authorities on digestive diseases is still under a cloud on account of unprofessional conduct earlier in life. It is humiliating to be obliged to confess that the medical specialist has but followed in the footsteps of the pioneer quack, yet too much credit can scarcely be given to the former for having so soon effaced the tracks of the latter.

Unfortunately, however, the general practitioner still regards the specialist as a parasite, grudges him his source of livelihood, and reluctantly yields to him only the most refractory cases, or implores his charity for the poor while the rich are subjected to experiments till their patience is exhausted. We appreciate the fact that there are specialists who are dishonest, who have essayed the niceties of an art whose rudiments they do not comprehend, who deserve the epithets "fakes," bluffers," and other more refined but less expressive terms which have been bestowed upon them. We believe, however, that such instances are the exception, and shall proceed with the discussion of this topic without any qualifications which the allowance for dishonesty would require.

The general practitioner too often sums up his relation to the specialist as follows: "I have sent patients to that man; he is dependent on the favors of men like myself, and what does he do in return?" Superficially considered, it does seem as if the obligation were all on the side of the specialist, but a little analysis will show that it is mutual. So far as requirements of preliminary and medical training are concerned, including the expenditure of time and money, specialist and general practitioner are on the same footing before the law. The support of medical societies, of medical literature, of social and benevolent enterprises in the profession, is drawn equally from all. The specialist has, in nearly every case, been to a much greater expense for post-graduate study; he is compelled to exert greater effort to keep abreast of new discoveries; his books, instruments, and office service are more expensive, yet he has voluntarily renounced his right to practice medicine except in a limited field. He may not reciprocate favors by sending patients to all those who have referred cases to him, but his more or less public announcement that he wishes only cases of such a nature leaves a greater demand for the services of those who say, "What has he done for me?" We must not forget that many patients consult a specialist who would not go to the general practitioner, and whom the latter could not relieve if they did seek him. The general practitioner who expects the specialist to reciprocate in the referring of patients, may well pause to ask whence the specialist is to draw such patients. Unless in the transitional stage from general practice to specialism, the specialist cannot refer patients to the general practitioner unless we count the very occasional and not very desirable cases who ring the door-bell of the first doctor whose sign attracts their eyes, or unless patients sent from one physician are diverted into the practice of another, or unless the specialist is taking patients which do not belong to him for the sake of cancelling debts of courtesy. It must be remembered, therefore, that the best evidence that a specialist is acting in good faith and that he is reciprocating the favors of the profession as a whole, is the fact that he is not in a position to return in kind the referring of a patient.

Undoubtedly the lot of a specialist is more desirable than that of the general practitioner. This is apt to be the case with any position which only a comparatively few can reach after patient

preparation, prolonged effort and the demonstration of unusual brilliancy—or unusual capacity for hard work, which is sometimes mistaken for brilliancy. The specialist is less exposed to inclemency of weather, his fees are larger and more certain, but, on the other hand, his actual hours of work are at least as many and less diversified; he may save the time of transit which the general practitioner must waste, but he lacks the recreation which the latter can intersperse with professional cares. If his fees are larger, and more promptly paid, he must show more attention to his patients and must spend more time in general study and experimentation, and, in the long run he must demonstrate his ability to obtain better results. And finally, specialists, though comprising but a small part of the total medical profession are called upon for the greater part of the gratuitous attendance on physicians and their families.

Whenever we find a specialist overstepping the proper bounds of his practice, the reason is one of two factors which act and react on each other. Either the specialist is unfair to the rest of the profession in following the plan of keeping all he gets and getting all he can, or the general practitioners are not sending to the specialist enough patients to keep him busy in his own specialty. We are inclined to think that the blame rests more often on the general practitioners since, every time the specialist accepts a patient who does not belong to him, he admits that he is not thoroughly successful in his own line, and fails to advertise his specialty in a legitimate manner to a possible clientele. The general practitioner, on the other hand, may secure a confinement or an accident case through demonstrating his skill with pneumonia, and he is not under obligations to turn away any case which does not present peculiar difficulties calling for special apparatus or special experience for its diagnosis and treatment.

We believe that, as for all attempts at codifying medical ethics, the Golden Rule affords the best solution of the problems which arise in settling conflicts between specialist and general practitioner. The general practitioner who calls every gastric disease dyspepsia and treats all impartially with bismuth and pepsin, the orificialist who essays to relieve catarrhal headaches by stretching the sphincter ani, the gynæcologist who removes the ovaries of a hysterical girl, the nervous specialist who uses hypnotic suggestion to cure a case of bronchitis which he calls spasmodic asthma, the men who are so consistent in their limitations of practice that the oculist sends his patient to the physician for a cathartic pill, and the gynæcologist and the surgeon bow to each other across the brim of the pelvis while the patient is mulcted of a double fee—to all such men and to others who choose to quibble over the mutual rights of specialist and general practitioner, we can only say, cultivate a conscience.

Emperor William had Prof. Roentgen to rush from Wurzburg to Potsdam to give an illustrated lecture to the royal family on his alleged discovery of how to photograph the invisible, and bestowed on him the Order of the Crown, the same second-class decoration that poor Koch got; but already it is found that this discovery was not only made by a Prague professor in 1885, who got an admirable photograph of Mont Blanc at dark midnight by the use of cathodic rays, but that a full report of the achievement was made to the Austrian Academy of Sciences in 1885.—*London Correspondent New York Times, January 19.*

There is a street in the aristocratic portion of the city of Canton, China, called "Physic street." It is the abode of the wholesale druggists.

ABSTRACTS.

TREATMENT OF PUERPERAL MASTITIS.

In an article on this subject in the *Brooklyn Medical Journal* for December, 1895, Jewett states that whatever difference of opinion there may be with reference to the methods of infection, prevention clearly depends on such measures as are directly or indirectly antiseptic. In other words, the indications for prophylaxis are, to promote the resisting powers of the lying-in patient, both local and general, and to maintain as far as possible a surgical cleanliness of the danger points.

Prevention begins in the management of pregnancy. The pressure of tight clothing in the later months of gestation, especially in primiparæ, is obviously inconsistent with the proper development of the nipple, and it directly increases the tendency to occurrence of fissures during lactation.

The cleanliness of the nipple, which is so necessary after nursing begins, should be maintained for at least a month before labor. A borax wash (tablespoonful to the pint) is a suitable detergent. A plain soap-and-water bath meets the requirements. Daily cleansing keeps the parts free from excessive accumulation of sebaceous material and exuded colostrum.

The domestic popularity of brandy as a nipple lotion during the later weeks of pregnancy is perhaps in part explained by the anæsthetic effect of dilute alcohol upon the skin. Surgeons who use alcohol in the process of hand-cleaning can testify to its action in hardening the cuticle and blunting its sensibility. There is reason to doubt, however, that bathing the nipples with alcoholic and other astringent lotions is a suitable preparation for nursing. It is more probable that hardening the skin predisposes it to cracking. It would seem more rational to keep the nipples as supple as possible. The application of fresh cacao-butter, or some equally bland emollient, after the daily cleansing, promotes this end.

Gently drawing out the nipples with the fingers once a day during the last weeks of pregnancy helps to develop them and to inure them to the prospective manipulations of the child's mouth. This practice on the part of the expectant mother is especially advisable if the nipples be small or retracted.—It is the duty of the obstetrician to warn his patient early of the necessity for all the foregoing precautions.

When nursing begins, the delicate cuticle of the mammilla is broken and abraded, and during the post-partum month the septic exposure is especially increased by the contact of hands liable to be infected from the lochial discharges. The occurrence of thrush or of ophthalmia in the child obviously adds to the risk of mammary infection. Hence the need of a cleanly management of the nipples during the first weeks of lactation. The avoidance of septic contact is clearly important. Bathing with a boric-acid lotion after each nursing is useful. A saturated aqueous solution is not too strong. Cleansing the infant's mouth with a similar wash, once or twice daily, is in the interest of both mother and child. Care must be taken not to abrade the buccal mucous membrane, lest the practice invite the trouble which it aims to prevent. For the breasts, more active antiseptics are more effectual, but they require greater care in their use. The author has employed with satisfaction a dressing wet with a mercuric-iodide solution (1:5000 or 1:1000). The mercurial must be rinsed off with boiled water or with the boric-acid solution before nursing. In Tarnier's hospital service there were four abscesses in 1235 puerperæ with whom the boric-acid lotion was employed, and only three in 1727 when this antiseptic was replaced by the bichloride.

In the writer's practice, mammary abscess has become, in recent years, an exceedingly rare occurrence—a fact fairly attributable to the improved aseptic care which the lying-in woman now receives at the hands of the professional nurse.

Milk engorgement is combated by

training the child early to nurse. The infant should receive its first lesson as soon as the condition of the mother will permit, usually within six or eight hours after birth, and no effort should be spared in teaching the child to suckle before the milk secretion is fully established. The use of the breast-pump, as a rule, is unsatisfactory; it frequently fails and is liable to bruise the breast.

At the hands of a skillful nurse, massage is often useful for the relief of overdistention, either of the entire breast or of single lobules. It is contra-indicated in the presence of inflammation, and is permissible only when not painful. The breasts should be well oiled in order that the nurse's efforts be not expended in mere friction. The stroking should be practiced in the direction of the lactiferous ducts, from the base of the gland toward the apex. In hypersecretion the compression binder is an extremely valuable measure. It is applied firmly, the pressure being evenly distributed over the breast by a moderately thick layer of cotton wool under the binder. An opening in the center of the cotton compress prevents injurious pressure upon the nipple. Harris uses compression both as a preventive and a curative measure in mastitis. Horne recommends an elastic bandage in engorgement. Topical applications of oleate of atropia are effectual for diminishing the milk secretion, but they must be used with care lest the secretion be too much repressed. Saline catharsis and the restriction of liquids are indicated in over-free secretion.

A part of the prophylaxis which must not be overlooked is addressed to the general health of the patient. Tonics are indicated in the majority of convalescents from child-birth.

Essential for the prevention of mastitis, is the preventive and curative treatment of nipple lesion. In addition to what has already been said with reference to the prophylactic care of this organ during the early weeks of lactation, it must not be forgotten that prolonged maceration of the nipple in the child's mouth is injurious. A single nursing need not occupy more than ten, or at the most twenty minutes, and regularity should be insisted upon.

The cacao-butter or some other similar inunction may be employed with advantage after each nursing, the surfaces having first been cleansed as already explained.

Excoriations and fissures heal in most cases under proper and timely antiseptic treatment. An ointment of equal parts of subnitrate of bismuth and castor oil may be used as advised by Hirst. The writer prefers to this a similar ointment made with the glycerite of starch. But the glycerin preparation may not always be well borne by the skin. The ointment should be frequently sterilized by heat. Before applying, the parts should be disinfected, a valuable agent for this purpose being hydrogen dioxide. While a host of nipple lotions and other applications have been recommended in these affections, none is more rational or promises better results in ordinary cases than some simple but carefully executed antiseptic plan of treatment.

Pain during nursing may be relieved to some extent by penciling the nipples five or ten minutes before the child is put to the breast, with a one to five per cent cocaine solution, heated to the sterilizing-point shortly before using. A one to two per cent. carbolic lotion applied in the same manner is sometimes useful as an anæsthetic. The addition of one-tenth its volume of glycerin prolongs the action and keeps the skin soft.

Deep and painful fissures may be treated with a solid stick of nitrate of silver. The entire raw surface should be touched. The lips of the fissure being well separated, the caustic point is drawn slowly through it. Care must be taken that no excess of moisture is present, otherwise the dissolved silver salt may trickle over the surrounding surface, and healthy structures be injured. A serious objection to this treatment is the exquisite pain it causes. This may be in a great measure prevented by first benumbing the part with a four per cent. cocaine solution. After the application of the caustic the nipple may be covered with a piece of lint, well wet with the anæsthetic lotion. The affected nipple should be rested, if possible, for twenty-four hours or more. Instead of the solid stick, repeated applications of an aqueous solution of the nitrate of silver may be preferred; in

the strength of one or two per cent. it causes little pain, and frequently does good service.

In excoriations and fissures that are not too sensitive and do not bleed readily, the nipple-shield may be tried; it protects the nipple from the friction, and to some extent from the maceration of sucking. Unfortunately for this method, the child as well as the mother has to be consulted, and the substitute is not always accepted. If artificial nipples are used, it is important that they be rendered aseptic by boiling for five minutes in water immediately before using, and not handled with unclean fingers. Similar protection to the nipple lesions is afforded, though in a less degree, by coating the affected surfaces with a pellicle of compound tincture of benzoin. When other measures fail, suspension of nursing for one or two days sometimes succeeds. If both breasts are affected, each may be rested on alternate days. The breast which is not in use should be firmly supported with a compression binder, the nipple being relieved of pressure by the plentiful use of cotton wool beneath the binder.

It is extremely rare that the nipple lesions are so rebellious to well directed treatment as to necessitate the total abandonment of nursing.—*Therapeutic Gazette.*

SOCIETY REPORTS.

OBSTETRICAL SOCIETY OF CINCINNATI.

Meeting of October 10, 1895.

RICKETT'S HYSTERECTOMY NEEDLES, ONE-THIRD SIZE: HOW TO DO A VAGINAL HYSTERECTOMY WITH THEM.

DR. EDWIN RICKETTS: With the vagina as near aseptic as possible, the uterus is grasped with a strong catch-forceps and pulled well down into the vagina, and with the broad blade of a Simons or Jones speculum held in place by an assistant; the uterus is separated from the bladder by means of a pair of scissors, cutting transversely for a distance of a little more than one inch. If the uterus is very much enlarged, it may be necessary to use the inch and one-half needle. With the needle armed with *heavy* Chinese silk twist, the square end of the needle is shoved up through the opening beneath the bladder until you are satisfied that you are well up above the left uterine artery; you then turn the point of the needle well down to the cul-de-sac, and pull the point of the same *through* the *peritoneum, cellular tissue and vaginal mucous membrane.* With a pair of catch-forceps you then take hold of one end of the silk and pull it down into the vagina, and holding it fast, you shove the needle back into the pelvic cavity; turning it on to the flat surface the same as when entered, you draw it out into the vagina through the primary opening, liberating the other end of the silk.

Again arming this needle with heavy silk, you introduce it through the same opening with the point of the needle turned to the opposite side. Turning the point of the needle well toward the cul-de-sac and hugging the uterus, you pull the point of the needle down through the *peritoneum, cellular tissue* and *vaginal mucous membrane* into the vagina, delivering one end of the silk as previously described, pushing the needle back into the pelvic cavity, and bringing it out beneath the bladder and uterus. After tying both ligatures *as tight as possible,* being sure that you cannot break the silk, with the left index finger passed through the opening between the bladder and uterus, cut the button as large as possible. Do the same for the opposite side.

With the scissors open up the Douglas cul-de-sac, freeing the uterus, after which pull it well down into the vagina, and also turn the fundus down into the vagina. By this means the round ligaments are brought into the field of operation and are easily ligated, after which the uterus is easily delivered, parts cleansed, stumps cauterized, and gauze placed.

There is no pain following ligation in this manner, and the hemorrhage is practically *nil.*

DR. A. W. JOHNSTONE: Do you go into the peritoneal cavity, or just into the uterine cavity?

DR. RICKETTS: I don't try to go to the round ligament. Then I take the scissors, go into the cul-de-sac and bring the uterus down. The round ligaments then come down and I tie and cut away, and the vaginal hysterectomy is done in about the time it takes to tell it.

The angle of the handle allows the needle to come up under the symphysis, and it is easier to work with than a straight-handled instrument.

In August I was consulted by a patient from the East End, referred to me by Dr. Langsdale. She was forty-eight years old, and gave a history of a long-infected uterus. There was every evidence of pus-tubes, and because the tissue was so soft and the patient of that age—she had not menstruated for some time—I concluded to do a vaginal hysterectomy for the pus-tubes and infected uterus. This procedure is now being brought forward by Richelot, of Paris, for the removal of fibroids. Feeling it would make no difference what might be done as to curetting, a series of trouble was likely to be kept up, I decided to take the whole thing out, and with this needle I was able to take out the uterus in fifteen minutes, and with it the pus-tubes; by retroverting the uterus and pulling some down into the vagina, the pus was forced into the vagina, and the ligatures—four in number—were applied, one to either broad ligament and one to either round ligament. In two weeks the patient was up and about.

One thing is certain, there are cases of removal of pus-tubes in which I only regretted afterwards that I did not do a hysterectomy. In the way I have described we get rid of the ligature that is generally applied close to the uterus, and with it the chances of having an infected ligature, which sometimes gives us an old sinus to deal with. These ligatures were left long and are now all off, which I think is much better than if I had taken away the pus-tubes and left the uterus, and possibly not have relieved the patient, as we have up to this time. I must confess I was agreeably surprised at the manner in which the patient recovered. It has been all that I could ask.

DISCUSSION.

DR. RUFUS B. HALL: Do you feel at all uneasy in reference to hemorrhage when you ligate as much tissue as your remarks would infer you did?

DR. RICKETTS: Not at all.

DR. HALL: You took a large bite of the tissue when you tied the uterine artery; did you fasten the mucous membrane off at the side?

DR. RICKETTS: I didn't pay any attention to the vaginal mucous membrane, and I had no trouble or pain following.

DR. HALL: I am convinced from the doctor's remarks that an instrument of this kind would be of very great utility and advantage in making vaginal hysterectomy, and I am convinced, too, more and more, every operation I make of this kind, that in the large majority of cases where vaginal hysterectomy is made similar to the one reported by the doctor the ligature will supplant the clamps. I will grant that in some instances it is necessary for the best interest of the patient to use the clamp and make a shorter operation. For instance, in an unmarried woman with a small, contracted vagina and deep pelvis, it is more difficult to make a vaginal hysterectomy without a ligature. But in a woman who has borne children, and especially one that has a wide pelvis, it is not a difficult operation to a man who is doing this kind of surgery, to make a vaginal hysterectomy with a ligature. But occasionally, if the uterus is fixed by inflammatory adhesions, it is difficult. But this is a very ingenious instrument, and, like all ingenious things, as a rule, it is a very simple one, and it only needs to be seen to be appreciated by any one doing this work. I have for several years used an instrument devised by some foreign man. It is a long forcep curved at the handle. I pass it through and catch the ligature and pull it through; but I believe it would be easier to use the instrument presented to-night.

As the details of the operation for vaginal hysterectomy, I have learned to put on many ligatures. I do not trust the smallest part of tissue to go without a ligature. Instead of tying large portions with the ligatures, as the doctor does, I put a ligature on every portion, and take small bites. This takes longer, but I believe it is better than to have night-mares from the possibility of a ligature getting loose and some tissue slipping out. A small portion does not require so much tension to strangle it.

In the first two or three operations I had more bleeding following than I wanted. In one case I found the bed for a foot square saturated with blood, three or four hours after the operation. I took out the dressings at once and found a large portion of tissue with the ligature in perfect position, but every time the heart beat you would see a little trickle of blood. I had not constricted it tight enough. I put on a pressure-forcep and left it about twelve hours, and that was the end of the bleeding, but I believe the woman would have bled to death in less than twelve hours without that. Perhaps a couple of months after that I had another case in which the bleeding was from the tissues. It was not so plainly evident, but I put the pressure-forceps on. Both cases made easy recoveries. Since then I have used the clamp in several instances, but only when the ligature could not be used satisfactorily. I shall try this instrument the first vaginal hysterectomy I make, which will be in a few days, and I hope I will be as well pleased with it as the doctor seems to be.

DR. CHAS. BONIFIELD: I have never had any personal experience in vaginal hysterectomy in that I have never made one myself, although I have seen quite a large number of them made. But this question of ligatures is certainly an important one. I have seen Dr. Reamy operate a number of times, and also Martin. I think the position between that held by Dr. Ricketts and Dr. Hall is the proper one. If you are operating for a fibroid and the uterus is very much enlarged and sub-

involuted, the broad ligaments stretched, and you have to ligate a piece so broad it is almost impossible to get it in a round string so it will hold. I think at least two or three ligatures would have to be used on each side. But in a small uterus one ligature is sufficient. Martin used a good many ligatures, and stitched the vaginal and peritoneal coats together right around, but I think that is unnecessary. But in Dr. Ricketts' operation, if I were to include a large amount of tissue I certainly would cut through the tough tissue so the ligature would slough off easily. I think the instrument is a very valuable one, and when I make a vaginal hysterectomy I shall certainly try it.

DR. JOHNSTONE: I am very much pleased indeed with the looks of this instrument, but, like Dr. Bonifield, I have never made a vaginal hysterectomy. I have three or four cases I have thought of doing it on, but I have never yet made it. But I think this would be a very valuable instrument, and the time I would use it would be before I got into the peritoneal cavity to secure the uterine artery. The idea of it is one that has already been expressed by me, not to secure too much tissue at a bite, for in vaginal hysterectomy four ligatures are all you need. If you get the four big trunks, that is all that is necessary. If you are sure you have secured the uterine arteries on either side, although they may be big ones, one ligature is all that is necessary. The only criticism I would have to offer would be to use this in the cellular tissue before you get into the peritoneal cavity, and, I think, too, I would avoid tying the ligature around any mucous membrane, and try as far as possible to tie the uterine artery itself. With just such an instrument as this we would then have complete mastery of these cases. The only thing is, couldn't it be used in a semicircle instead of at right angles? All the attachments of the uterus can be cut loose and the uterus dragged down, but I don't think it would be just the thing to hook this around the round ligament. The main advantage is it enables us to secure the uterine artery.

DR. G. E. JONES: Mr. President, while you were speaking I was thinking we have a great advantage over the ordinary curved needle in this way—that it takes less room. In abdominal work I can see very readily how it can be carried down through the tissues with the finger over it, and as it is pushed through it brings the ligature in at once. It facilitates that kind of work.

DR. RICKETTS: The object in having this made at angles was to get as much tissue as we could in this way, say as much as the thumb. In going up over the uterus and coming down it is in a straight line with the shaft. You know where the point of the needle is going to come out.

There has been a great deal said about cutting away the vaginal mucous membrane, and that any ligature applied under such circumstances as suggested in this case is always productive of pain. Such is not the case. I have talked with other men doing vaginal hysterectomies, and they claim it is not necessary to take the vaginal mucous membrane before applying the ligature. If you tie against the mucous membrane your ligature is not so liable to cut, therefore you can tie a tighter ligature.

There is another advantage in the use of this instrument over the use of the clamp. This needle is small, and we all know that in a vaginal hysterectomy clamps take up much space that is valuable to use in the work. We can slip this up and work in a very small space, which gives it an advantage over the use of the clamp.

As to the subject brought up by our President about the use of this sub-peritoneal, I must say that I do not care much whether it is sub-peritoneal or otherwise. In the case in which I used it I brought the peritoneum down with it towards the mucous membrane, which goes to make up, so to speak, for what Martin used to do in stitching it round and round. In other words, you apply the ligature to the stump just as in removing the appendages you bring the peritoneum in position before cutting the button. So in this way you draw the peritoneum and vaginal mucous membranes near each other, and it was with that in view in the case I reported I made this go through the peritoneum first, then the tissue, and then the vaginal mucous membrane.

DR. JONES: A few years ago two or three of our homœopathic friends had a case in St. Mary's Hospital. Of course, like all hospitals, we give them the right to treat their own cases. Dr. Russell, of Springfield, operated, and kindly invited me to see the operation, which I gladly accepted. He was not, I suppose, more than thirty or thirty-five minutes doing the operation, although it was rather a difficult case. I do not think I ever saw more clamps in an instrument-bag than he had. I do not think he had less than thirty-five or forty. After he had made the incisions in the anterior and posterior portion, going up around the ligament, as fast as he made the cut he put on these clamps, and when he was through he had a number on each side. Then as fast as he took out the clamps he followed up with the ligature, and I do not think he lost more than half an ounce of b
one of the most bloodless operations I ever saw. It was rather a novel operation, but was practically bloodless.

Presentation of Specimens.

DR. RUFUS B. HALL: I want to present a pair of specimens of hydrosalpinx that are interesting on account of the large size of one of the tubes, as specimens of distended tubes.

This specimen was removed on the 7th of September, and since then has been in alcohol. It was then a third or a half larger than it is now. The tube was distended to the utmost. The fimbriæ have entirely disappeared from

the distended tube, and I present it as a kind of novelty because it is such a large tube. I have never seen one this size removed. It was universally adherent, and would have held at least twelve ounces of fluid. The other tube is also of good size, but looks like a baby compared with this. It is also a hydrosalpinx. The ovaries were both removed. One was removed in shreds, as it was so friable that it broke up during its removal. Neither one could be removed whole. The ovaries can hardly be recognized as such now, but could be readily recognized as ovarian tissue at the time of the operation.

The patient was thirty-five years old, married ten or twelve years, and has always been sterile. She had some inflammatory trouble of a mild character soon after marriage, but aside from some prescription from her physician, did not require any treatment until about six years ago. Since then she has suffered considerable pain at the menstrual week. The menstrual flow has been scanty. She suffered considerable pain, there being an uncomfortable sensation in the pelvis, a sense of not being well. About a year ago the fibroids were lengthened out until she suffered pain about two weeks instead of one, and ceased to participate in the ordinary pleasures of life, and lay in bed for two weeks at each menstrual period, seeing a doctor occasionally for relief from the pain. The last few months the pains had been almost constant. Her physician told her he thought she had a tumor about the size of a cocoanut in the pelvis, for which he advised an operation, but to which she would not consent. They would not consent to a consultation for that object until five or six weeks ago, when her suffering became constant and so severe she was in bed most of the time, and rarely able to go on the street. To look at the woman she appeared to be well. She suffered most from the pain in the pelvis upon walking. Five or six weeks ago she consented to a consultation with the view of an operation. The pelvis then was filled with this mass and the uterus. The whole mass appeared to be smaller than an ordinary cocoanut. No fluctuation could be felt, although the specimen is so thin it seems you could not possibly fail to have fluctuation. I account for the failure to obtain fluctuation in this way: The uterus was pushed upward and above, and the tube being adherent behind the uterus, the tube and uterus made practically one tumor, with the uterus in front. And the fact that she was suffering with chronic peritonitis made the abdominal muscles rigid, and practically the only examination we could get was with the finger in the vagina, reaching only a small segment of the growth. The opinion was expressed that there was a tumor, and we would open the abdomen and make a diagnosis later. It was something that should be removed, although probably not a fibroid. The history was one of salpingitis. The operation was made on the 7th of September, and both ovaries and tubes removed. The patient left the hospital to-day, and said she had never been so happy since her wedding-day. The uterus was not enlarged, but appeared to be of the normal size.

DISCUSSION.

DR. BONIFIELD: I have seen but one case, I think, in which the hydrosalpinx was so large as in the case just reported, and that was in the practice of one of my friends in the Presbyterian Hospital. The tube was very large, and the operator was unable to remove it entire. I have never myself had a case in which the tube was so largely distended. I have seen them pretty largely distended with pus, but not to that size. The case is interesting from the fact that the doctor was not able to make a satisfactory physical examination before removing this interesting specimen.

DR. JOHNSTONE: This is very interesting. I do not think I ever saw anything so large except tubes containing pus. It shows the difficulty of diagnosis between tubes and ovaries. As the doctor says, you never know what it is until you operate. I remember once, about three years ago, an old case of gonorrhœa which had been worrying the woman for a good while. The case was referred to me by a general surgeon. I was a young operator in this city then. I pulled out the whole capsule of the ovary, containing nothing but pus. My assistant insisted upon getting his face down close to see, and the thing cracked and hit him square in the mouth. In that case the tube I removed was almost double the size of the one presented this evening. I got it out without bursting it at all, but the tubes are very rotten unless they have been there a long time and have a pyogenic membrane, from which there is scarcely any absorption. Of course, some water is taken up, because you find cheesy stuff there. It is wonderful how little of constitutional symptoms these cases give. I remember Dr. Hall has presented some cases here with few symptoms similar to cases I have had. But for hydrosalpinx, this, in my experience, is a monster.

DR. HALL: I would like to add one thing to this case report. For a year the woman had suffered very greatly from dyspepsia. She never took a meal but it caused great dyspepsia and sour stomach, and for the past four or five months that had been much worse. Indeed, there was some doubt at one time as to whether or not she had some organic disease of the stomach; but within a week after the operation her dyspepsia disappeared. She then ate with relish everything allowed her, and such a thing as a sour stomach has been unknown for three or four weeks.

DR. JOHNSTONE: It is only an illustration of the old adage we have had so often—of every ten cases with stomach trouble, you will find nine with pelvic trouble.

DR. BYRON STANTON: How about ten men?

DR. JOHNSTONE: Quinine and whiskey.

DR. EDWIN RICKETTS: I think there are other things that can cause gastric trouble. In a case which went to make up the substance of a paper before the Society of Obstetricians and Gynecologists in Chicago a few weeks ago—a case of gall-stone—the patient had suffered from diarrhœa which neither opium nor any other drug would control. Yet on the examination a nodule could be felt in the median line directly over the pylorus, and to such an extent that it was diagnosticated by some physician as a cancer of the pylorus. Yet there were symptoms about the case that made me think it was probably an obstruction of the gall-duct, although she had never had any typical attack of colic. Upon opening the abdomen I found a stone in the common duct immediately under the median line and under the pylorus. In less than four weeks after the removal of the stone she went home with the diarrhœa cured. A letter from her tells me she has never had any since. So some of these cases are due to a condition of that kind. She did not have any medicine whatever, except minute doses of calomel before the bladder was closed.

DR. JOHNSTONE: It would take a paper to elaborate what I mean. In a paper during the winter I spoke about reflex troubles of the uterus. I believe the vast majority of women who have bad stomachs have some trouble in the pelvis. One I remember had most persistent salivation. I suppose she expectorated gallons every day. In that case chronic endometritis was found, and three days after the packing was put in the salivation stopped. I think the reason for it is perfectly plain. The stomach has more intimate relation with the solar plexus than almost any other very active organ. You know the vast majority of women come in with disease of the pelvis. Now, I do not mean to say that women do not have trouble with the liver, pancreas and other organs, but more than half of the cases of disease of the stomach that come to you are due to pelvic disease.

Presentation of Specimen.

DR. A. W. JOHNSTONE: Here is a specimen that in itself is so very common I am almost ashamed to show it, except for a text of one of the most troublesome cases I have had to deal with. It is nothing but an appendix. In May the possessor of it had an attack of appendicitis. She was the mother of one child, after having been married three years, and the child now is three years old. The specimen is only an ordinary appendix, and there was nothing found in it but some mucus. Since May, when she had her first attack, she has had a fresh attack about every thirty days, and I saw her in September with the fifth. It was perfectly plain what was the matter. There was a swelling just at McBurney's point, but the pain, as usual, was relieved when I saw her. She was kept in bed and quiet and brought down to the city. I had examined the pelvis and found the uterus retroverted. She insisted that she was pregnant, for she had missed one period. The cervix was hard, the body retroverted and somewhat fixed and enlarged. I thought it was nothing but a little sub-involuted, but, to my horror, when she came to the city I found her to be about six weeks pregnant, with the appendix still tender and a fresh attack threatening. Judging the future by the past, the attack was just about due. The attacks would come on slowly and gradually, and result in what seemed to be a peritonitis, so I thought I was simply driven to take the appendix out. The operation proved I was to a certain extent correct, because it was one of the hardest operations I ever had to do. A great mat of intestines was the first thing I came to. They were separated one by one and the little adhesions tied. I hunted for the appendix, and at last, after three-quarters of an hour's search, found the nasty thing hanging over the brim of the pelvis. It is very much shrunken now, but was fully four and a half or five inches long, filled with a sort of muco-serous stuff. Right down where it entered the cecum there seemed to be a stricture, very narrow and apparently almost solid. I ligated at that point. Cut the appendix away and seared the surface with a hot needle. The operation was done at 10 o'clock this morning, and the temperature to-night is 99°, and the pulse about 90. But all afternoon there were peculiar pains which made me very uncomfortable, as if the uterus had begun to contract. But the question arises whether those attacks were not due to the action of the uterus or to the colic from the ligatures being tight and causing intestinal action. During the afternoon the cramps became further and further apart. They were very much lighter than during the day, but at one time were every ten or fifteen minutes, and very firm. My reason for doing the operation is that had it been let alone she was almost certain to have more and more attacks. There was hardly less than half an ounce of fluid the appendix, not purulent, but showing a marked catarrhal condition. The uterus is small down in the pelvis; but suppose we had waited until the sixth or eighth month, then it would have forced the appendix down against the pelvis and we would have had a hard time finding it. So in spite of the risk of bringing on miscarriage at this time, I thought it the only thing to do.

I notice in the *British Gynecological Journal* a report of removal of ovarian tumors during pregnancy and the women going on to full term. One was double ovariotomy, and the woman carried the child to full term. They were all by the same man. So I bring you this specimen for a double purpose.

DR. C. D. PALMER: Will you enumerate the symptoms you had during the attacks?

DR. JOHNSTONE: The symptoms were these, as she told the story to me. She was out horse-back riding in May, and came home

with a pain, which annoyed and worried her for several days. She went to bed and the bowels became constipated. After a week or ten days she got some relief, the pain was better, and she was up and about. About thirty days afterward, although the pain had never ceased, she had another attack; and each successive attack was worse than the previous one. From one attack she got up and went on a trip before she was well. The fourth, if anything, was the worst, and that time she had about three days of obstinate constipation, and there were present all the symptoms of an acute peritonitis. Those were all the symptoms except the lump. It couldn't be anything but an inflammation in the region of the appendix.

The other point is, this is the third consecutive appendicitis upon which I have operated and found nothing in the appendix, but in each one of them I have found strictures at the entrance to the intestine.

This was the third attack, and the woman gave a history of having discharged a quart of pus from the bowel. There was no adhesion. I found a little appendix, not nearly as long as your thumb, and the end of it about as large as a hazel-nut. I found nothing in it but a stricture at the orifice. So I do not think grape-seeds and enteroliths and such things play so important a role as we think. I believe we get appendicitis just like we get inflammation of the prostate—from retention of the secretion. In the case of one of the sons of a physician in this city a post-mortem was made and a gangrenous appendix found, but nothing in it. There was also a stricture. No hole whatever could be found where it entered the intestine. The mesenteric glands were as large as my thumb, and all the Peyer's patches and the solitary follicles were strewed with large tubercles. And so I believe many of these cases are tubercular. My experience lately, within the last six months, makes me think the foreign bodies do not play much of a rôle, and it is more of an inflammation through retention-pockets of one kind or another, and we get the irritation of the appendix just like we get the posterior urethritis.

DISCUSSION.

DR. EDWIN RICKETTS: A married lady, with a history of a purulent discharge through the vagina, consulted me in August. Upon examination I made a diagnosis of an old pus-tube upon one side and a chronic inflammatory process of the opposite tube. The uterus was fixed. I couldn't understand why it was this patient gave a history of pain for several months, only occasionally, however, to the extent of having to resort to morphia for relief. I advised an abdominal section and an attempt to remove the diseased appendages. It didn't enter my mind that we had a diseased appendix to deal with; but after removing the appendages I examined the vermiform appendix. After searching for it for ten minutes, I found the appendix over the crest of the ilium, adherent something like the one described by Dr. Johnstone. It was at least four inches long and full of fecal matter and concretions. I removed the appendix close and returned the intestine. The patient made a good recovery. I always, if possible, when operating for pus-tubes or anything else, examine the appendix. If I had not done so in this case the patient would still have had the pain and the operation would have been justly censured. I think Dr. Johnstone operated at the right time.

DR. HALL: In a case such as Dr. Johnstone reported this evening we should operate as soon as possible, whenever we can get the consent of the patient. In reference to the remark of Dr. Johnstone about the closure of the lumen that enters the colon, his experience does not quite agree with mine. I have made quite a number of operations for appendicitis, and in a large percentage of cases I found a foreign body in the appendix. Some of the cases I have exhibited to this association. But there is a large percentage of cases due to an extension of a colitis in which the bacillus coli communis is the exciting cause of the inflammation. This little appendix is closed, but the secretion of mucus continues, which, later becomes, perhaps, purulent from the repeated attacks of inflammation.

I operated at Christ Hospital the last week in July upon a young clerk from Greenville, O., about twenty-five years of age, who had his first attack a few months before. When operated upon he weighed, I suppose, 120 pounds, although before he had weighed something like 140 pounds. He had pain and a distinct lump in the right iliac region. The lump was as large as your closed hand and the rest of the abdomen flat. Walking would start an attack of inflammation. On operation I found the lump made up largely of intestines and omentum. The appendix was about the size of the index finger, and perhaps two and a half inches long. The attachment to the colon was not larger than a lead-pencil, and appeared like cartilage.

During the same week I operated upon another case, at Christ Hospital, in the fifth week of his first attack, in which he had perforation, and perhaps a pint and a half or two pints of pus.

Shortly afterward I was called to Mt. Sterling, O., to operate upon a boy, on the thirteenth day of the first attack. In that case also there was perforation.

So we have here the three conditions. The first trouble is likely catarrhal. The second case is of questionable origin; whether or not there was a foreign body we do not know. It may have been of catarrhal origin. The third case was from a foreign body, and evidently took place after suppuration was established. Perhaps in half of the cases there is a foreign body.

In reference to the question spoken of by Dr. Johnstone, as to the probability of abortion, that is all problematic. I would say, all

things considered, I do not think there is as much danger of an abortion in that case as if he had tied off the ovary, for the operation was further from the seat of pregnancy. Cases of pregnancy will frequently stand severe operations without abortion. I reported a case to this society of the removal of a large tumor during pregnancy and the child delivered at term. Since I operated upon that case I have operated upon a pregnant woman in which I removed both sides. She was two or two and one-half months pregnant, and at term was delivered of a healthy boy. The child is now several months old. I shall make this case the subject of a detailed report to the society later. Pregnancy could not be made out certainly before the operation, everything was so agglutinated together. She did not abort. These cases do not always abort easily, but sometimes they do. I operated one time upon a case in which the woman aborted upon the second day and died a few hours afterward. It is not always the phlegmatic that abort.

DR. BONIFIELD: Dr. E. W. Mitchell reported to this society the case of a negro woman upon whom he operated for fibroid tumor about the size of a head. The tumor was pedunculated. The patient was about three months pregnant, and did not abort.

PERISCOPE.

MEDICINE.

Diet for Albuminuria.

Don't eat starchy foods at the expense of the albumins. Albumin must be supplied in a mild degree or serious trouble will arise. The kidneys will excrete albumin in spite of a non-albuminous diet.

Milk and whole wheat bread should form the bulk of the diet. Take also sub-acid fruits, as apples, bananas, figs and dates. Green vegetables, as spinach, celery, lettuce, and occasionally a baked sweet or white potato, boiled rice, macaroni, and tomato sauce. Fish may occasionally be used. Avoid red meats and eggs.—*Mrs. Rorer in Household News.*

Effects of High Pressure on Germs.

Dr. Roger, a French physiologist, has been making a series of experiments to determine the influence of pressure upon bacterial life. He found that a pressure of 550 lbs. had no influence upon pus-producing germs, germs of erysipelas, bacillus coli, and several other pathogenic organisms. A pressure of 3,000 atmospheres had no influence upon the bacillus coli, but slightly attenuated the anthrax bacillus.

OBSTETRICS.

The Results of Version After Symphyseotomy.

Spaeth reports a case of symphyseotomy in which he succeeded in delivering a living child by version and extraction after having failed with the axis traction forceps. He has collected all cases of symphyseotomy since the year 1887, and finds that symphyseotomy in combination with version presents a mortality of 9.5 per cent. to mother and child, while with the forceps the mortality is 11 and 21 per cent. respectively. His literary search failed to substantiate the claim of Schauta that version after symphyseotomy is likely to cause a laceration of sacro-iliac synchondrosis. As version is the best method of delivery in minor degrees of pelvic contraction, it is rational to suppose that it also gives superior results after symphyseotomy.

Critical Remarks About Vagino-Fixation and Colpocelitotomy in Their Relation to Pregnancy and Labor.

A. Mackenrodt states: The suturing of the fundus uteri to the vagina, after the peritoneum has been opened, leads to the formation of firm adhesions which hold the uterus in a position of pathological anteflexion. Under such conditions normal pregnancy and labor are only possible if these adhesions are broken either spontaneously or forcibly. If they remain intact the pregnancy is interrupted or labor is likely to be complicated. These same disturbances result if the uterus is fixed with silk-worm gut. The author cites a case of labor following ventrofixation. The uterus was in a position of decided anteflexion, the cervix high and directed posteriorily; in spite of strong pains no dilation. Only after the adhesions were ruptured and a version was performed could progress be noted. In a second case the uterus was sutured to the vagina with silk-worm gut; marked disturbances occurred in the third month of gestation, which disappeared immediately upon the removal of the retaining sutures. The uterus which is lifted from the peritoneal cavity and fixed to the vagina is apt to relapse to its old position. This forcible withdrawal of the uterus from its anatomical position may also cause severe hemorrhage from the tearing of the ovarian arteries or their branches. A kinking of the Fallopian tubes with subsequent sterility has also been observed. These complications may be avoided by fixing the uterus in an improved

position by a complete obliteration of the excavatio-vesico-uterina. To do this the bladder must be separated from the peritoneum well above the plica. Next the antero-uterine pouch is obliterated by continuous catgut sutures. This method of operation fixes the uterus by peritoneal adhesions, which stretch if pregnancy ensues, to again contract during the puerperium.—*The American Journal of Obstetrics.*

NEWS AND MISCELLANY.

Women's Medical Club.

It may be interesting to the profession to learn that Chicago goes on record as having organized the first "Women's Medical Club." The club is in a flourishing condition, was incorporated last month, and has a membership of thirty. The new society proposes to build a handsome city hospital in one of the crowded districts which shall be a monument to the women members of the medical profession.

Seats for Employees.

The New Hampshire Legislature has enacted a law compelling every person, firm or corporation employing females in any manufacturing, mechanical or mercantile establishment in the State to provide suitable seats for the use of females so employed, and shall permit the use of such seats by them when they are not necessarily engaged in the active duties for which they are employed. A fine of not less than $10.00 or more than $30.00 for each offence is the penalty prescribed for a violation of the law.—*Boston Med. and Surg. Journal.*

The Dispensary Question.

In the modern *morale* of medical practice there is, perhaps, no question more serious than the relations of the free dispensary to the general practitioner. It will be remarked that we have not written FREE DISPENSARY in capitals, and this in itself will explain our idea of the true relationship which should exist between the general practitioner and the College Dispensary. We have had positive evidence of the fact that people sufficiently able to pay a physician, seek to avail themselves of the opportunity to get free treatment at the College Clinic. It is also, on the other hand, true that at the College Clinic a patient will receive, perhaps, a character of treatment which conforms more closely to modern methods, from the fact that the operator or the prescriber is under the direct surveillance of men who have come to learn—many who have learned—and many who are themselves skilled and come for the express purpose of close criticism. From these conditions the patient gets the best treatment that modern science can offer him. But we are free to admit there should be some line of demarkation or differentiation at least, drawn between those able to pay for services thus rendered and those unable to do so. It is not an infrequent sight—the prancing of well-groomed horses before the College Clinic and the brushing of jeweled satin by the fustian of the poor. And it is further to be remarked that the rich do not willingly ever pay for the prescriptions they procure. For the benefit of the College this must be endured, for we cannot as yet see how it can be cured. We do not besitate to say, however, that it does work an injustice to the general practitioner, and those who can pay ought to be made to pay the same prices at the Dispensary as they would have to do in private practice.—*St. Louis Lancet Clinique.*

The Physician and the Artist.

Every man who has a *vocation* should have an *avocation*. It refreshes the tired brain to change its direcrion of function far more than to cease activity in a so-called rest. We are led to make this little note by listening in a stolen leisure hour to some original renditions by Dr. Carl Pesold of Wagner place, St. Louis, who, in the midst of an absorbing practice, finds time in evenings at home to delectate himself, his family and friends, with strains of sweet music. His nephew, Mr. Arnold Pesold, of St. Louis, who has just returned from Europe with flying colors from the University of Berlin, furnished the occasion for a grand family reunion, which served to lighten the cares of harrowing professional life and give new impetus to its labors. Art, music, special science and a host of other fields of thought relieve the great tension of a doctor's life, mellowing the influence of his character and softening the asperities of his business life. This is a point well worth considering.—*St. Louis Lancet Clinique.*

Anecdote of Dr. Leidy.

Dr. William Hunt, the famous surgeon, tells the following anecdote concerning the venerable doctor: Tne only instance I ever knew of Dr. Leidy's departure from strict truth was, to a medical man's way of looking at it, a very amusing one. Some years ago he came to my house in quite an enthusiastic mood, and said: "Dr. Hunt, do you know that they are moving the bodies from a very old burying-ground down town to make room for improvements?" "Yes," I said. "Well," he went on, "two bodies turned into adipocere are there (this is an amoniacal soap and the bodies are commonly called petrified bodies). They have been buried for nearly a hundred years; nobody claims them, and they would be rare and instructive additions to our collections." "All right; I shall be delighted." So Leidy went down to secure the prize. When he spoke to the superintendent, that gentleman put on airs, talked of violating graves, etc., so the discomforted doctor was about to withdraw. Just then the superintendent touched him significantly on the elbow and said: "I tell you what I do, I give bodies

up to the order of relatives." The doctor took the hint, went home, hired a furniture wagon, and armed the driver with an order reading: "Please deliver to bearer the bodies of my grandfather and grandmother." This brought the coveted prizes, and the virtuous caretaker was not forgotten.—*Medical Record.*

Negro Suicides are Scarce.

A remarkable characteristic of the colored population of the city is the fact that the proportion of them who commit suicide, who solicit alms or free lodging, and who are arrested, is much smaller than among any other class of people. A colored suicide is a rarity, and, while the officials of the coroner's office admit that there are some, they cannot remember when they had the last case of that kind. There are on an average about one hundred and twenty-five cases of suicide reported to the coroner annually, and of these less than five would be colored. Deputy-Coroner Dugan, who has been in the office for many years, can remember but a few cases of colored suicides. The natural light-heartedness and sunny temperament of the colored people may be given as their great safeguard against suicide. Reverses and disappointments, which, in a more sensitive class of people would result in despondency and eventual self-destruction, are laughed aside by the negro, who habitually looks on the bright side of life, and manages to get enjoyment out of whatever comes in his way. While the mere fact of being out of work does not affect the colored people enough to drive them to suicide, the evidence of their natural industry cannot be better illustrated than by making note of the small proportion of them who ask alms or seek lodgings in the city station-houses. A colored tramp is more of a novelty than a colored suicide. They are nearly always willing to work at anything that turns up, and all are, as a rule, self-sustaining.—*Medical Record.*

Dr. Jenner's Midwinter Ride in 1786.

The London *Lancet* brings to light a letter written by the immortal Jenner in January, 1786, that shows by how narrow a margin the discoverer of vaccination escaped an untimely death by cold and exposure, in which we call now-a-days a "blizzard." The letter runs as follows:

"JANUARY 3, 1786.—I was under the necessity of going from hence (Berkeley) to Kingscote. The air felt more intensely cold than I even remembered to experience it. The ground was deeply covered with snow and it blew quite a hurricane, accompanied with continual snow. Being well clothed, I did not find the cold make much impression upon me until I ascended the hills, and then I began to find myself benumbed. There was no possibility of keeping the snow from driving under my hat, so that half my face and neck was for a long time wrapped in ice. There was no retreating, and I had still two miles to go—the greatest part of the way over the highest downs in the country. As the sense of external cold increased, the heat about the stomach seemed to increase. I had the same sensation as if I had drunk a considerable quantity of wine or brandy, and my spirits rose in proportion to this sensation. I felt as if it were, like one intoxicated, and could not forbear singing, etc. My hands at last grew extremely painful, and this distressed my spirits in some degree. When I came to the house I was unable to dismount without assistance. I was almost senseless; but I had just recollection and power enough left to prevent the servants bringing me to a fire. I was carried to the stable first, and from thence was gradually introduced to a warmer atmosphere. I could bear no greater heat than that of the stable for some time. Rubbing my hands in snow took off the pain very quickly. The parts which had been most benumbed felt for some time afterward as if they had been slightly burnt. My horse lost part of the cuticle and hair at the upper part of the neck, and also from his ears. I had not the least inclination to take wine or any kind of refreshment. One man perished a few miles from Kingscote at the same time and from the same cause."

An Odd Locum Tenens.

The following extract, says *La France Medicale*, is taken from the "Memoirs of Marshall Castellane":

"The Marchioness of Talarn is over fifty, but she believes it is absolutely necessary for the good of her health that she should have a man beside her at night. Whenever M. de Talarn is absent she consequently makes her people sew up M. de Courtivron, one of his relatives, or else M. de Chavagnac, one of his friends, in a sack, and has him put into her bed. In the morning she is careful to summon her attendants, or, at all events, the chambermaid, in order that they may testify that the sack has not been unsewn. At present MM. de Chavagnac and de Courtivron both happen to be away at Madrid, attached to the embassy of M. de Talarn, so it is M. Boirot, physician of the Neris hydropathic establishment, who for the moment occupies the post of honor. I can assure you that this is in no wise a jest. My secretary is connected with the doctor, who positively is shut up in the sack every night."

Antitoxin Treatment.

The eminent pathologist, Virchow, who at first criticised the antitoxin treatment, presented some statistics at the Berlin Medical Society where the death rate had been reduced from forty-seven to thirteen per cent. "All theoretical considerations," he said, "must give way to the brute force of these figures," and he held it to be the duty of every doctor to use the serum.